FOUNDRY TRADE JOURNAL

EST. 1902

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

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FEBRUARY 9, 1961
Offices : John Adam House, John Adam St., London, W.C.2

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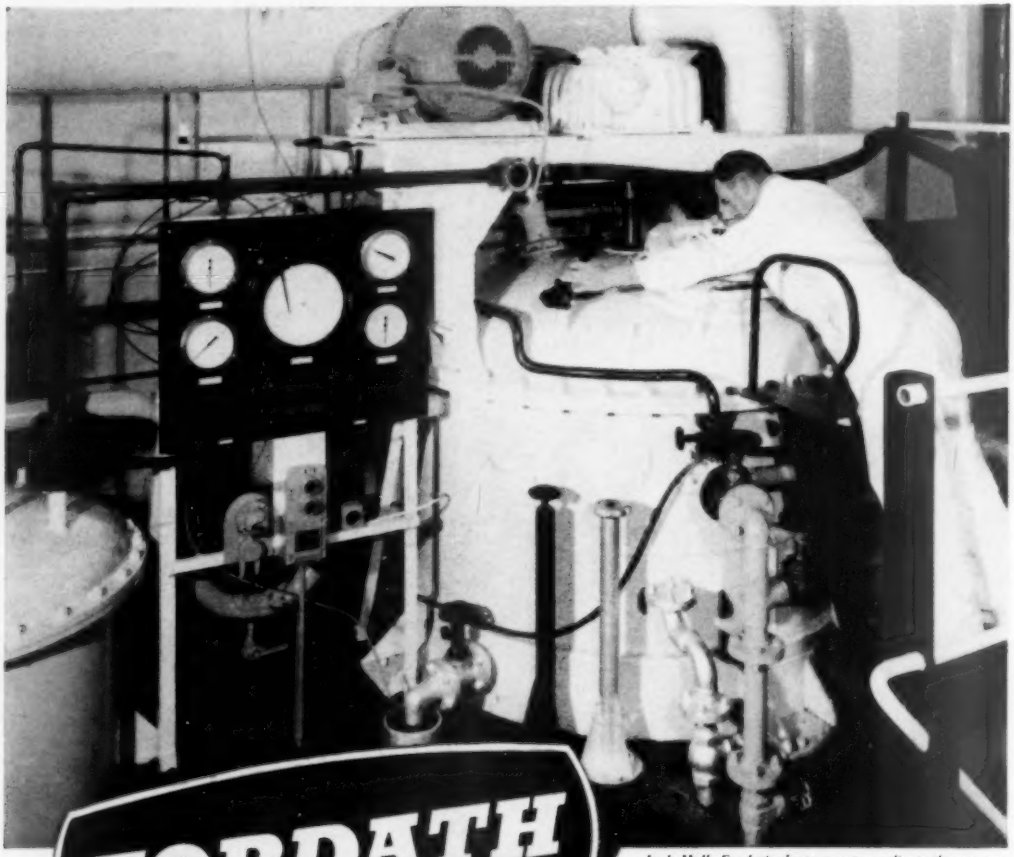

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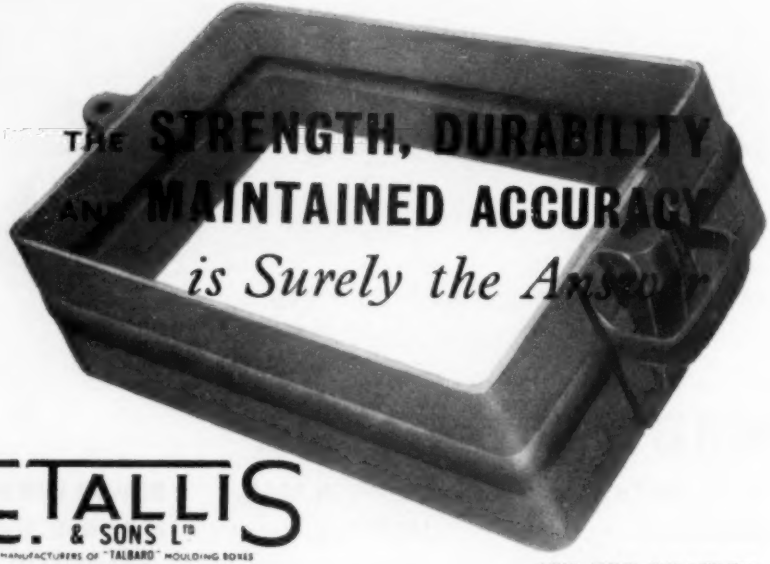

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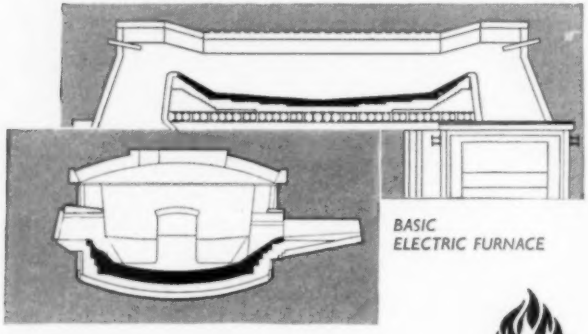

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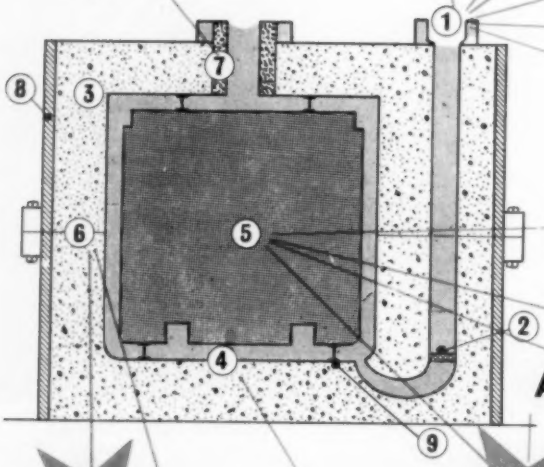

Key to Sectional Drawing of Mould

		Send for booklet No.
1	Metallurgical Control'use of Fluxes	3
2	Clean Metal by using Ceramic Strainer Cores and Discs.	4
3	Coal Dust additional to Facing and Backing Sand	1
4	Silverskin Blackings, Plumbago and Mould Dressings.	1
5	Cores using Crulin and Crudol Core Binders (Oil Bonded, Air Setting Cereal or CO.2 Binders).	2
6	Moulds Parted with Beecro Silica Free Parting Powder or Beecrol Parting Liquid.	1
7	Casting Feeding with Alsica Exothermic Foeder Heads.	4
8	Moulding Boxes supplied by B.F.U. }	5
9	Chaplets, Studs, etc. }	

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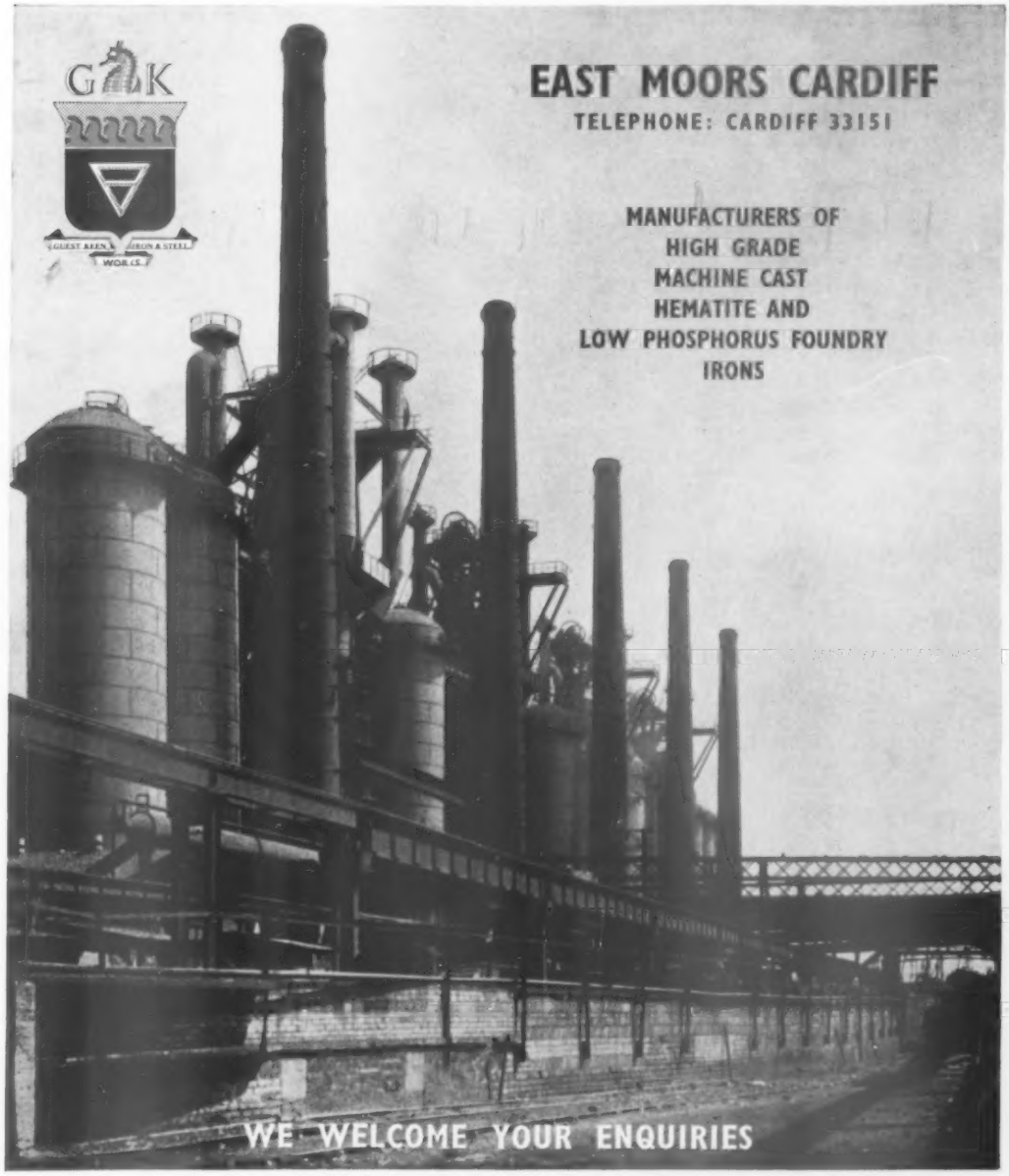

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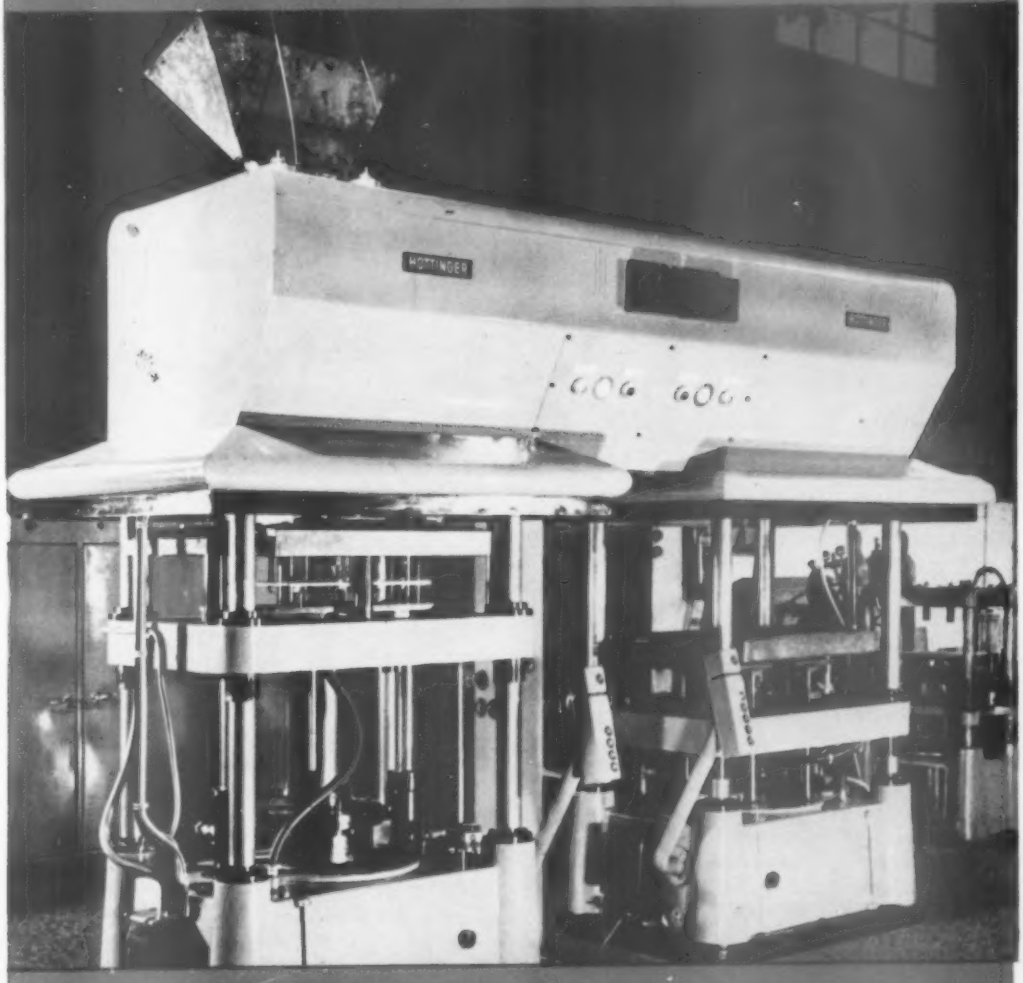

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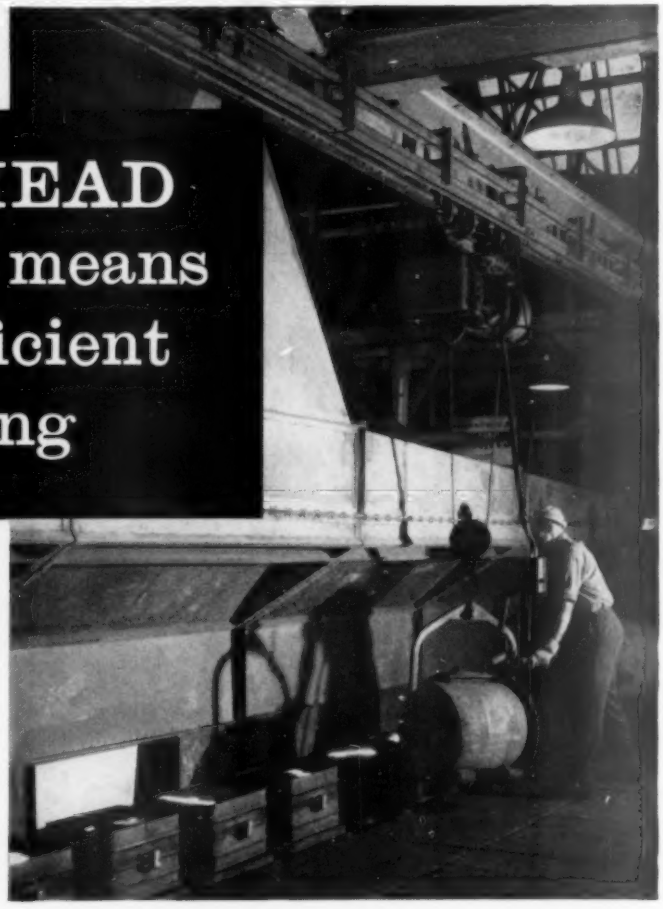

An overhead handling system from British MonoRail Limited means more economic, smoother pouring at the Derby foundry of The Leys Malleable Castings Company Limited. On the right an operator pours molten metal into moulds on a moving conveyor from a 500 lb ladle slung on a MonoRail track. The trolley and electric hoist on the track are moved by a power driven chain synchronised with the conveyor.

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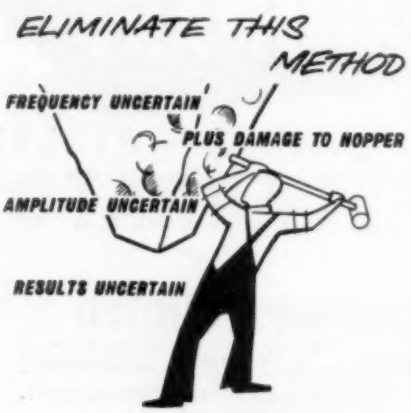

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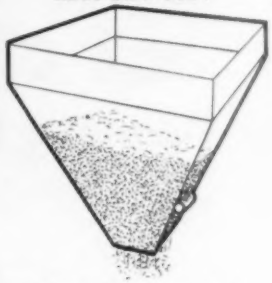
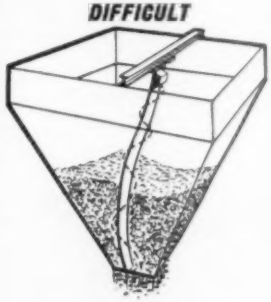


External vibrator on steel hopper.

DIFFICULT



Vibrating reed. Used where external vibration is impractical, i.e. concrete hoppers and difficult structures.

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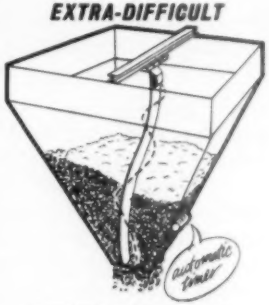

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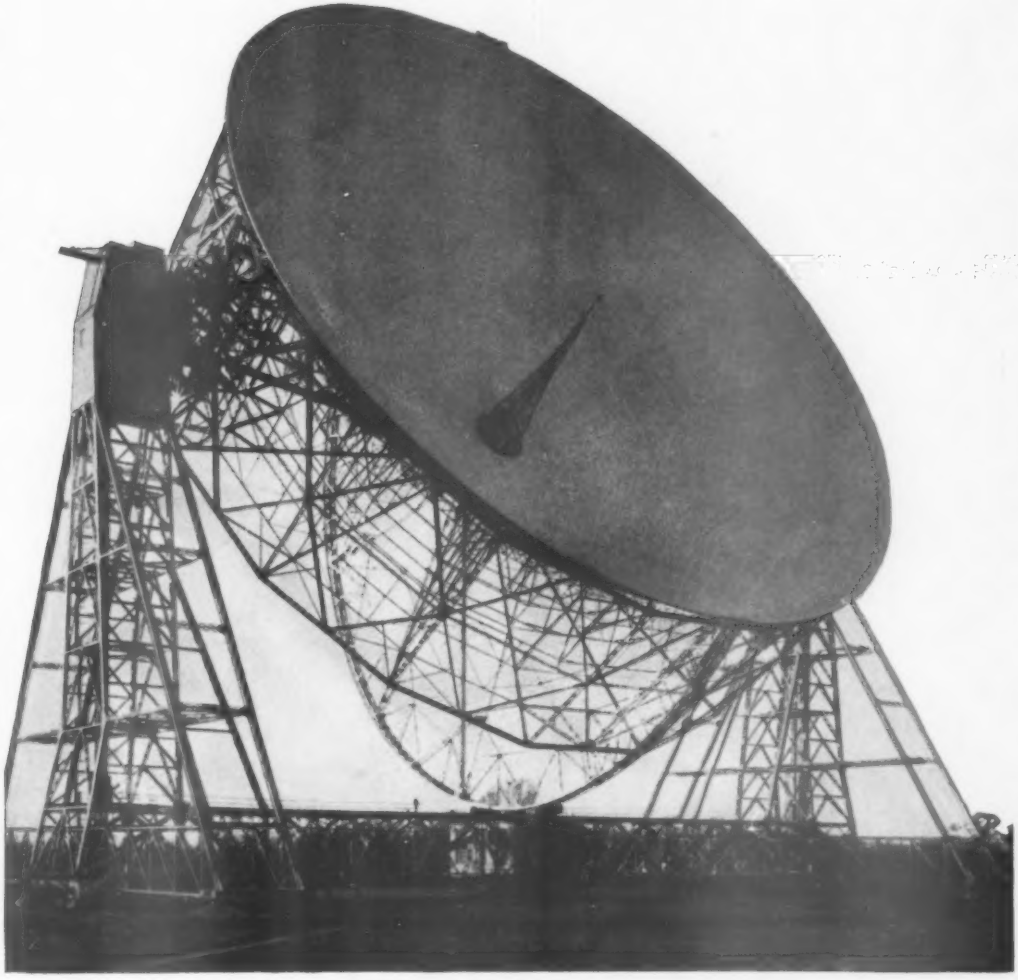

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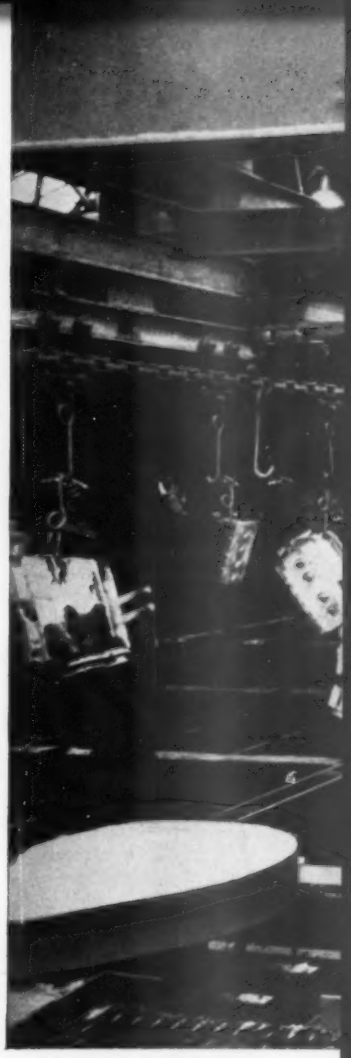

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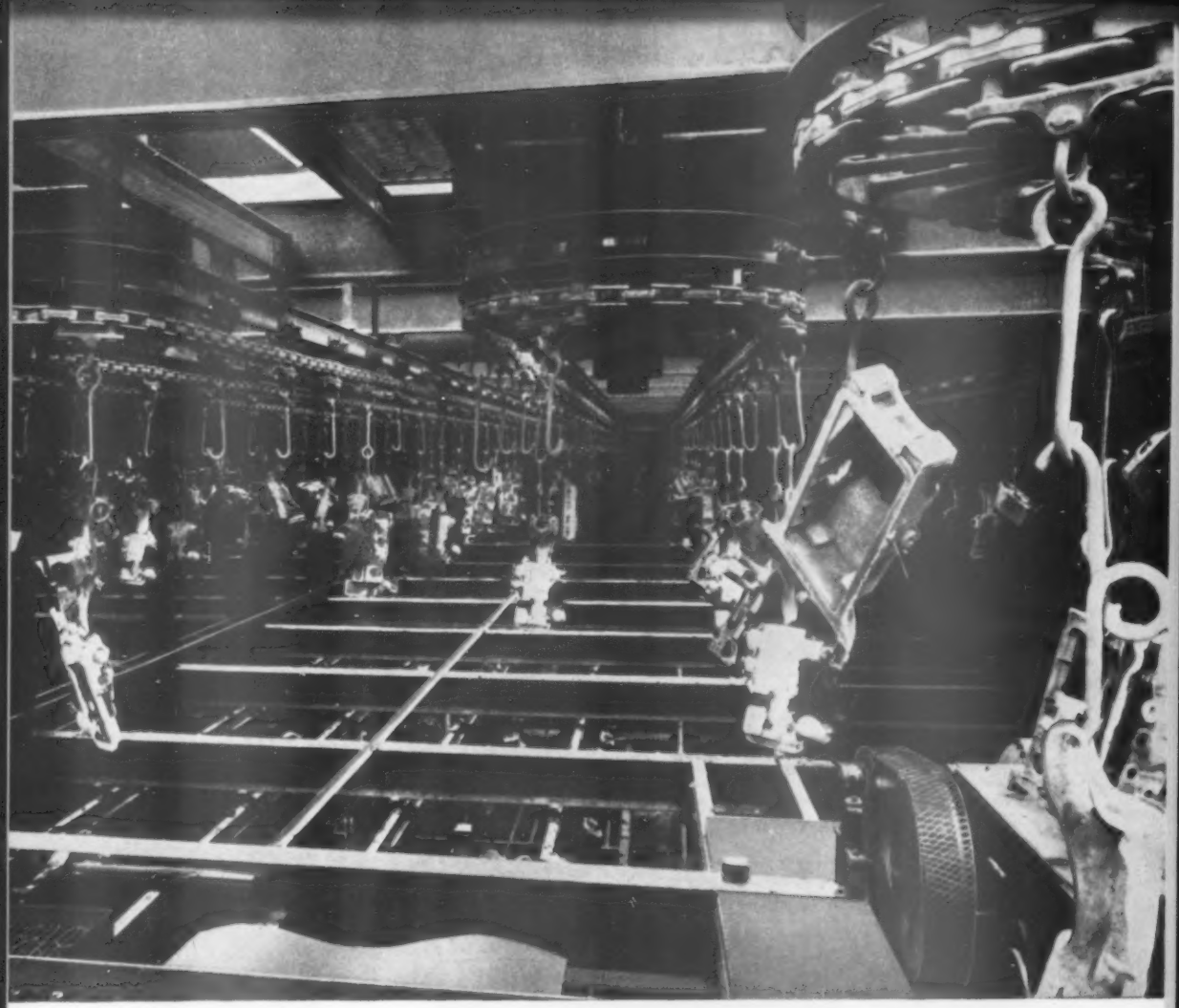

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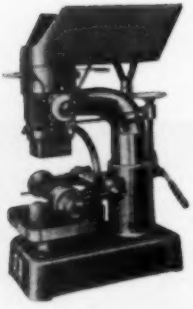

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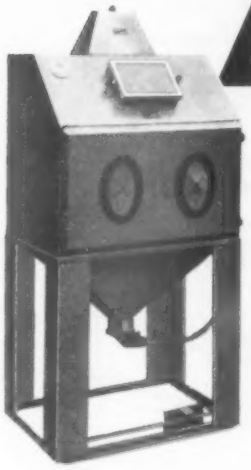

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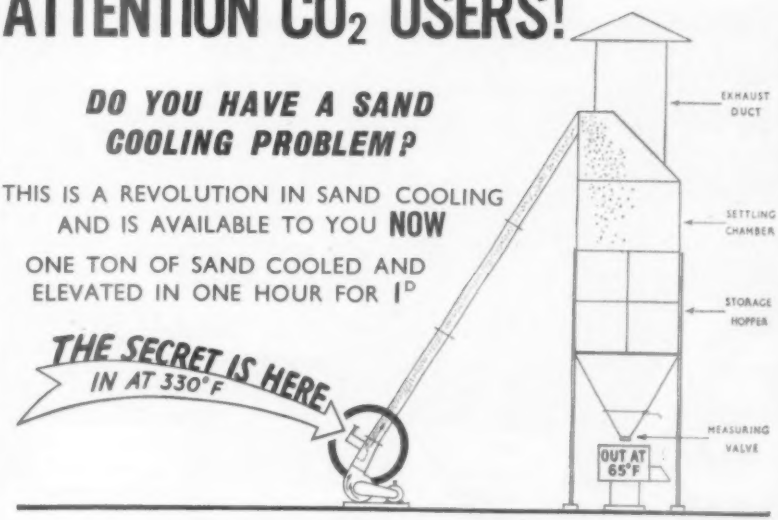

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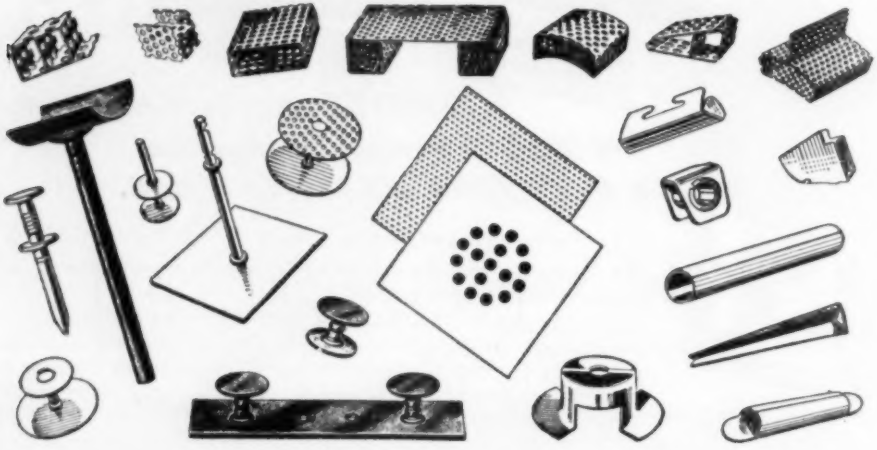

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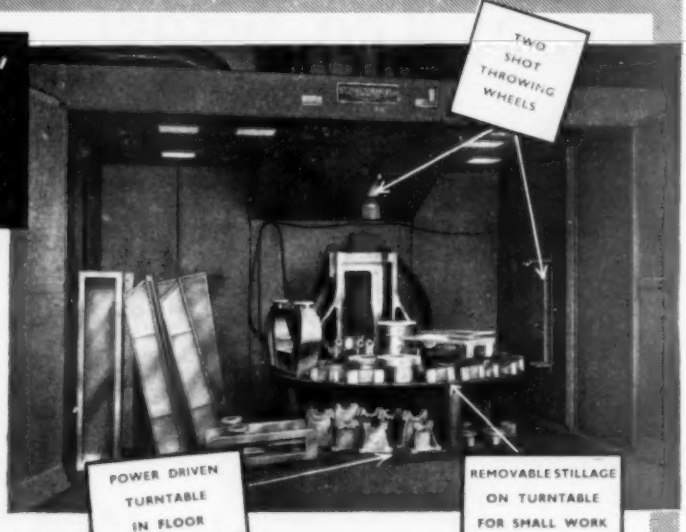

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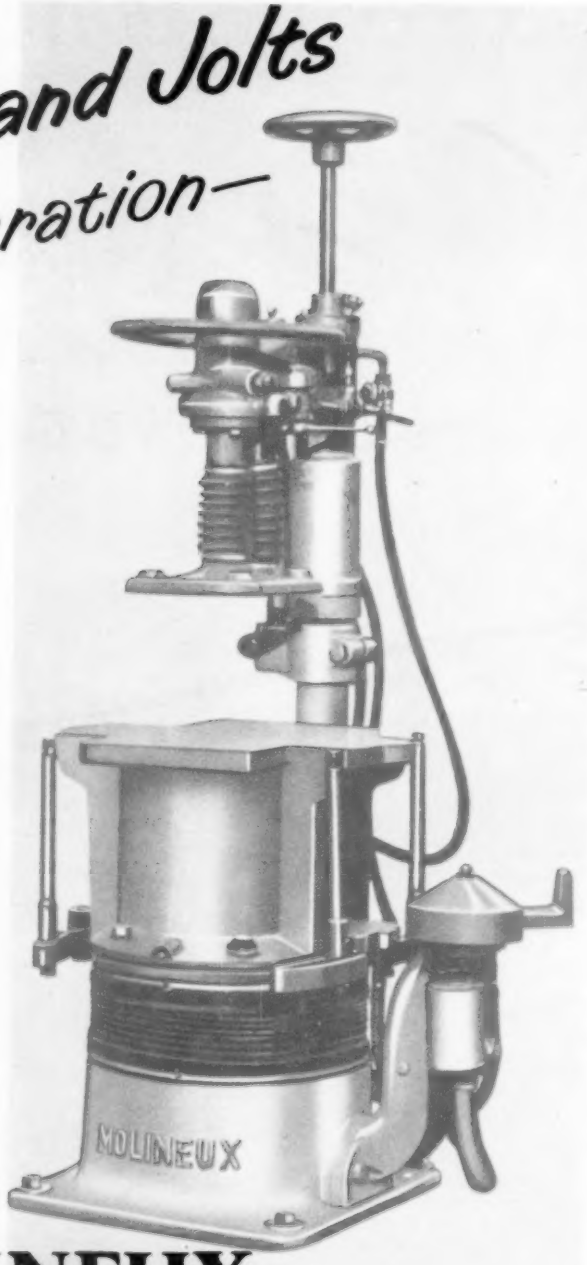

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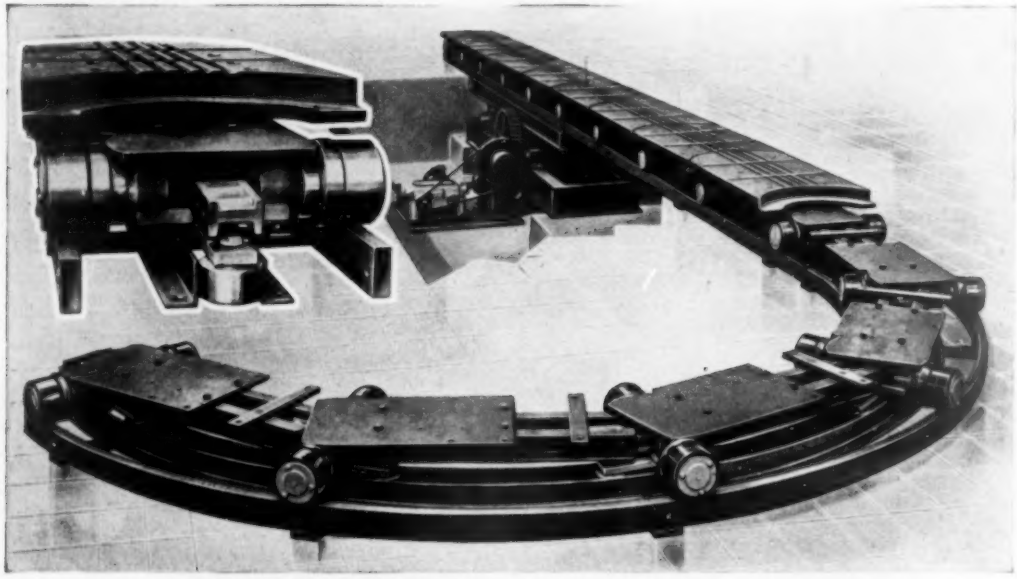

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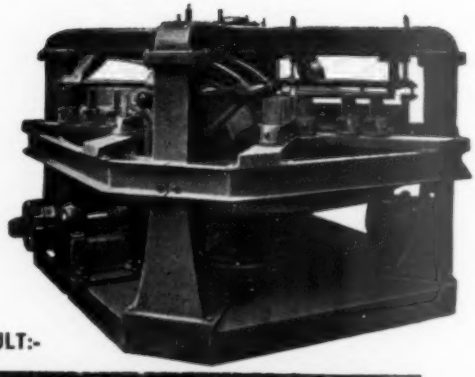

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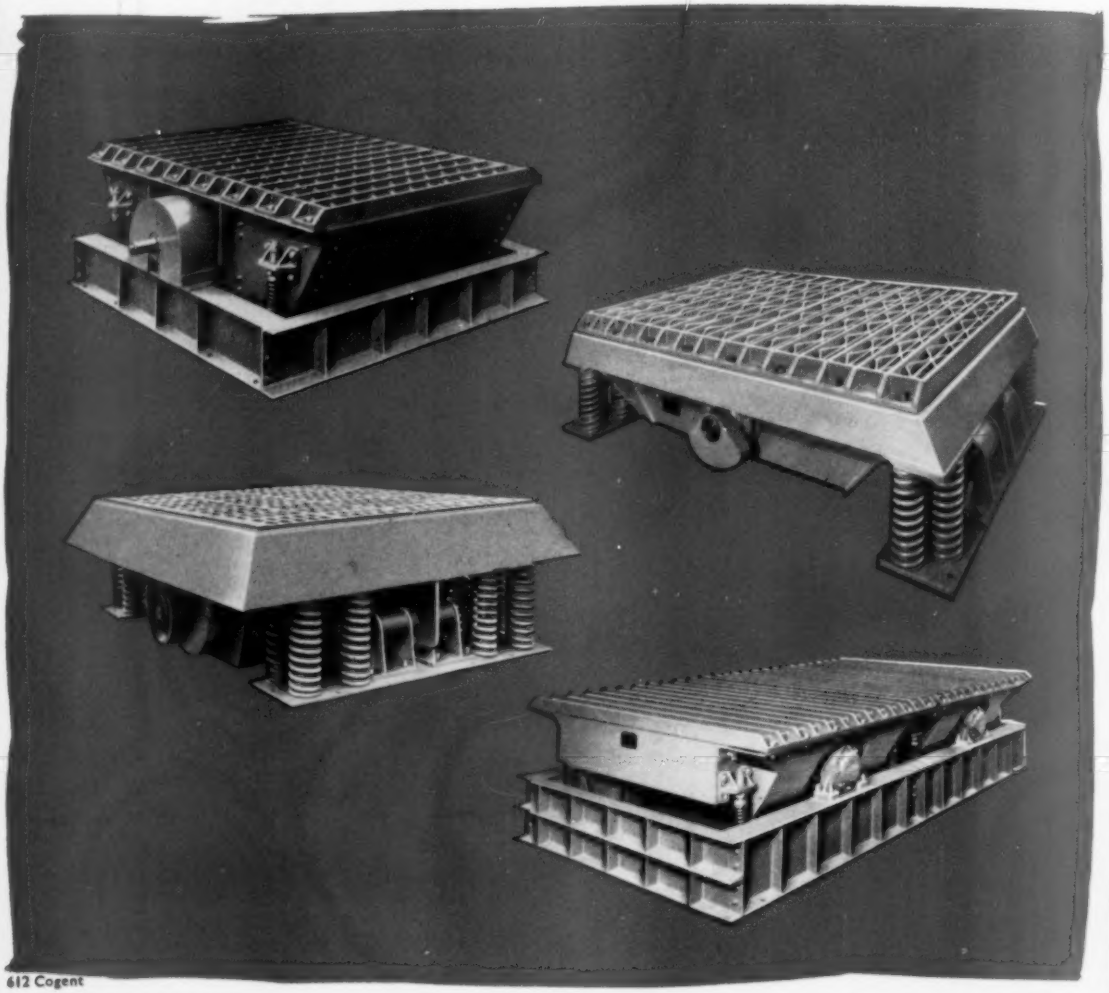

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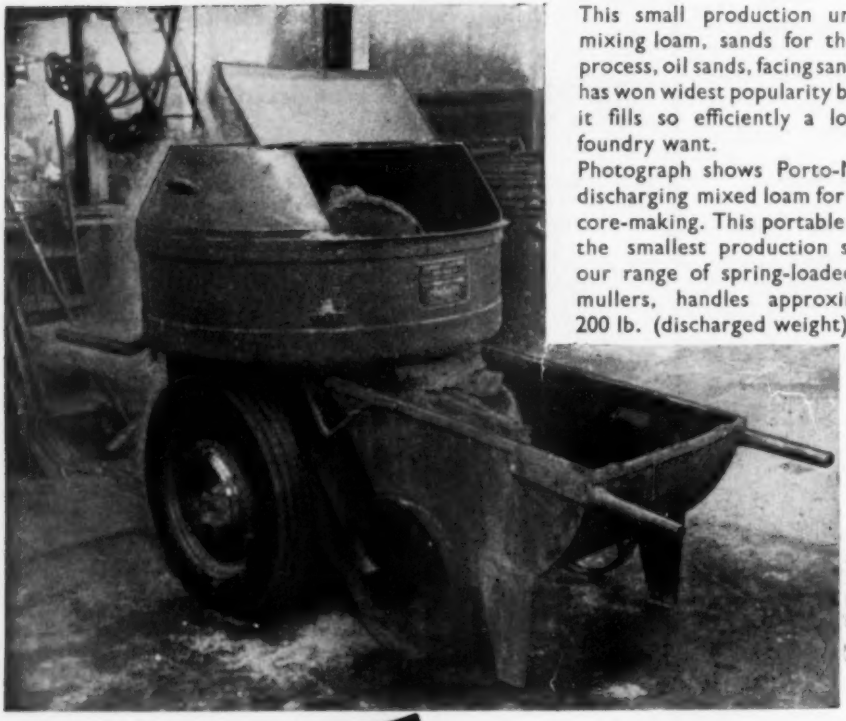
The portable unit for perfect SAND MIXING



This small production unit for mixing loam, sands for the CO_2 process, oil sands, facing sand, etc., has won widest popularity because it fills so efficiently a long-felt foundry want.

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FOUNDRY
TRADE JOURNAL

Vol. 110 February 9, 1961 No. 2305

Improving Customer Service

When a founder receives an order for castings, the customer is usually in possession of one or two names of members of the founder's staff—possibly the technical representative and the sales manager. As the job goes through, if for any reason there is any hitch, such as a modification being required or delay in delivery, the purchaser or maybe one of his departmental managers, may need to direct a telephone inquiry to one or other of the personnel at the foundry. Thereby he perhaps learns that he should talk to the progress man or some similar official and is " shunted " from one to another, with rising exasperation. Thus, when eventually a voice on the line assures him that the speaker " knows all about " the job in question, a feeling of pleasure and relief is engendered. The moral of the foregoing is that it would be both courteous and better business for founders to inform customers on receipt of an order that information as to its progress can be had by telephoning or writing to " Mr. Smith," who may be the foundry manager, foreman or progress clerk.

Some of the larger concerns in the foundry industry are excellently organized to deal with such matters, and a customer can get up-to-the-minute information as to the present position of his order. In fact, to our knowledge, one concern is so organized that any executive can answer a 'phone call within 15 seconds, no matter in what part of the factory he may happen to be. All foundries, however, cannot afford to give an ideal service, but there must be somebody in the organization who is in a position to give an immediate answer to queries, even before actual manufacturing has commenced.

The question of broken delivery promises has been dealt with in forceful terms by Sir William McFadzean, president of the Federation of British Industries, who regards failure in this respect a bad advertisement for British industry as a whole. Quite often this failure is due to pressure being brought by one or more customers on a pliable sales-manager. It is obvious that a single official must be in charge of production, but his decisions, when trade is brisk, should be subject to scrutiny and modification by the sales manager or managing director. The last named, through executive action, has to marry delivery promises with manufacturing facilities, as if these are not met there will be plant lying idle in the future. Obviously a production manager tries to keep an even loading on the plant, so as to ensure economy. This question of customer relations, be it easing the line of communications or eliminating the trouble of lateness of delivery, is so urgent that we suggest that it should be on the agenda of the next board meeting of every foundry firm in the country.

South of England Ironfounders' Association

Mr. F. C. South took the chair at the general meeting of the South of England Ironfounders' Association held on January 25 at Williamsons Restaurant in Bow Lane, London, E.C.2. During the course of the meeting, the opportunity was taken of presenting the annual training award of the Worshipful Company of Founders. This is only the second year that the award has geen granted; it is given to the best student attending the National Foundry Craft Training Centre over the period reviewed. The award is based not upon a particular examination, but upon the total of marks gained throughout all four courses at the Centre, together with assessment of the standard achieved in the final tests. The award takes the form of a cheque for £25 together with a special diploma, and at this year's ceremony it was presented to Mr. Milosh Sekulitch of John Hobkirk, Sons & Company, Limited, Bedford.

Mr. S. H. Russell (S. Russell & Sons, Limited) was asked to present the award and in introducing him, Mr. South outlined the many committees and national activities which had benefited from Mr. Russell's wise counsels and enthusiasm. He reminded members that Mr. Russell had been the leader of the Grey Ironfounders' Productivity Team which went to America 10 years' ago. Success in productivity, Mr. South continued, depended largely upon the way in which men set about their work and that, in its turn, depended upon training. It was therefore only natural that Mr. Russell devoted much of his time to the development of national training, education and research schemes in industry. Probably no one had spent more time on committees of one sort or another than Mr. S. H. Russell; he was chairman of the trustees of the National Foundry Craft Training Centre and Mr. South felt he was the right person to present the award.

One-mark Better!

In presenting the cheque and diploma to Mr. Sekulitch, Mr. Russell commented that he had attained a high standard, but had beaten the runner-up by one mark only. There was little doubt, he said, that the Training Centre was successful in arousing enthusiasm and the spirit of competition amongst the students.

After the presentation, Mr. W. T. Hobkirk then took the opportunity of expressing appreciation of the work of the Centre. He said that his company made it a habit to send every apprentice to the Centre for all four sessions if his parents were agreeable. He felt that the Centre was a splendid organization and the training received by the students was in his view very much better than that to be obtained from normal day-release schemes. In addition, he believed that the period of residence at the Centre's hostel did almost as much good as the technical training the youth received.

Closing the meeting, Mr. South took the opportunity of reminding members of the Association that although about £22,000 had been subscribed for the rebuilding of the National Foundry Craft Training Centre, it was essential that a minimum of a further £3,000 be found as soon as possible.

MILLSPAUGH, LIMITED—Mr. A. M. Weldon has been appointed a director, and Mr. H. M. Smith has resigned from the board.

Forthcoming Events

FEBRUARY 14

National Socley of Master Patternmakers

Visit to Vauxhall Motors, Limited, Luton, starting 10.30 a.m.

Institution of Plant Engineers

Manchester branch: "Introduction of Planned Maintenance Systems," by A. F. Stedman, 7.15 p.m., at the Engineers' Club, Albert Square.

Institute of British Foundrymen

Slough section: "Developments in Melting and Casting," by W. W. Glick, 7.30 p.m., at the Lecture Theatre, High Duty Alloys, Limited, Buckingham Avenue.

Stoke-on-Trent section: "Fundamentals of Foundry Management," by A. Kirkham, 7.30 p.m., at the Stipendiary Court Room, Hanley Town Hall.

Coventry section: "Trends, Research and Development in the Metallurgy of Cast Iron," by R. V. Riley, 7.30 p.m., in Room A5 of the Technical College, The Butts, Coventry.

FEBRUARY 15

Institution of Production Engineers

Wolverhampton graduate section: "Spark Erosion and its Applications," by B. J. Carver, 7 p.m., at G.K.N. Research Laboratory, Birmingham New Road, Lanesfield, Wolverhampton.

London graduate section: "Function and Scope of Modern Materials Handling," by W. G. Rumble, 7.15 p.m., at 10, Chesterfield Street, London, W.1.

Institution of Chemical Engineers

"Science and the Developing Countries," by P. M. S. Blackett, 5.30 p.m., at the Geological Society, Burlington House, London, W.1.

FEBRUARY 16

Combustio n Engineering Association

Western region: Discussion on "Factors affecting the Choice of New Boiler Plant," to be opened by W. Short, 10 for 10.30 a.m., at the Royal Hotel, College Green, Bristol.

Institute of Metals

Birmingham local section: "Growth and Prospects of the Aluminium Industry," by G. W. Lacey, 6.30 p.m., at the College of Technology, Gosta Green.

North-East Metallurgical Society

"Plastics *versus* Metals," by P. T. Moore and H. Hughes, 7.30 p.m., in the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough.

Institution of Production Engineers

Reading section: "Precision Investment Casting," by P. G. Chapman, 7.30 p.m., at Reading Co-operative Society, Limited, Cheapside, Reading.

Southampton section: "Materials Handling," by H. P. Mott, 7.15 p.m., at the Polygon Hotel.

FEBRUARY 17

Institute of British Foundrymen

Bristol and West of England branch: "Production of High-duty Iron Castings," by L. Clarke, 7.30 p.m., at the Royal Hotel, Bristol.

Stoke-on-Trent Section: Annual dinner/dance (details from secretary).

National Maintenance Exhibition

The first National Maintenance Exhibition and Conference is to be held at the Central Hall, Westminster, London, S.W.1, from November 13 to 16 inclusive. A wide range of topics is scheduled for the four-day conference. A session devoted to maintenance problems of the small plant is to be presided over by Mr. R. A. Scanes, a director of Associated Brassfounders (Birmingham), Limited, while Dr. J. E. Garside will be in the chair for a session on corrosion and new materials available to maintenance engineers. Details of the exhibition and conference are available from Maintenance Publishing Company, Limited, 109 Waterloo Road, London, S.E.1.

Castings on the Move . . . .

. . . . at the Smethwick Foundry of Dartmouth Auto Castings, Limited

Dartmouth Auto Castings, a company within the Birmid Industries' group, completed 25 years' operation last year. The firm's foundries are situated in Smethwick and West Bromwich and specialize in the manufacture of high-duty grey-iron castings which can be mass produced, the main customers being the motor, tractor, and railway industries. A foundry to produce spheroidal-graphite iron castings is just passing from the development to the production stage. To describe the present set-up of the foundry at Smethwick, the writer's choice of title was inspired by the fact that here is a foundry where once the manufacture of a casting is set in motion, processing never stops and the component is on the move all the time until it reaches the customer's works. It is quite clear that this phenomenon is not fortuitous, but is part of a planned production method.

The overall capacity of the Darcast foundries is 1,500 tons of castings for each 42-hours of operation, and of this amount some 850 tons weekly is made in the Smethwick plant which is the subject of this article. This production is secured from a total covered-in area of 107,400 sq. ft. (out of a total site area at Smethwick of 240,500 sq. ft.) giving the quite remarkable output of 0.4 tons per sq. ft. per year. This Smethwick foundry is also noteworthy in that the capacity has increased during the past ten years from 120 tons per week with little increase in the floor area and with a very small addition to the labour force. At the same time, the horsepower employed has increased from 210 to 650 giving some indication of the vast increase in machinery. In other words each man now has about 1½ h.p. at his elbow.

To complete the overall picture, the weight of castings produced ranges from two to 150 lb., and some 300,000 individual castings are handled each week. The total employment, including pattern-shop, maintenance and laboratory staff, but not supervisory grades, is 420 persons, which—for 850 tons per week—gives the quite remarkable productivity of over two tons per man/week.

The general arrangement of the foundry and ancillary buildings is shown in Fig. 1. It will be noted that five mould-producing units (for convenience numbered one to five) are grouped around the cupola furnaces and all the finishing operations are carried out in the main fettling shop. Likewise, cores are made in a centralized department. In what next follows, the individual departments are described.

Melting Plant

Four cupolas are employed, three being in use at any one time to give a total capacity of 34 tons of molten metal per hour. Blast temperature is maintained at 500 deg. C. and grey iron to BSS 1452, grades 14 and 17, is produced. The stock-yard is served by two overhead cranes of 5-tons capacity each; charges are first made up in skips and transported on a pair of cars incorporating weigh-scales. The skips, with charges of one ton total weight, are then hoisted and transferred to the cupolas by a telpher crane.

Molten metal is tapped from the cupolas into hot-metal receivers of two tons capacity which in turn feed 4-cwt. capacity ladles from which the moulds are poured. The metal is distributed throughout the foundry on a quite complex overhead monorail system.

Two types of metal are melted, corresponding to the required specification grades, a typical charge being 15 per cent. pig-iron, 40 per cent. back scrap, 15 per cent. bought-in scrap and 30 per cent. steel. All cupola operations are controlled by members of the laboratory staff, samples of metal for analysis being taken at 15-min. intervals. A wedge test-piece is cast from each ladle for quality check before metal is transferred to the pouring stations.

The metal selected for each job follows specification tensile requirements. For example, grade 17 iron is used for flywheels and bearing caps and elsewhere where there is a strength requirement in the component, and grade 14 is employed for gearboxes, manifold castings (as many as six of these are sometimes produced per box!) and other applications where ready machinability is required on somewhat lighter-section material.

Coreshop

Until some two years' ago, all cores used in this foundry were wholly of the oil-bonded type and vertical continuous ovens were used for core drying. At the present time, only a very small number of oil-bonded cores is employed. For most castings they have been replaced by CO_2/sodium-silicate-bonded cores and those made by various hot-box processes, since these later developments enable more-accurate cores to be produced and shorten the time between coremaking and the pouring of the casting. Nearly all cores are nowadays produced by coreblowing methods. Produc-

tion is so planned that stocks of cores are kept down to a minimum, there very seldom being more than one day's supply within the stores. The various coresand mixes are prepared in a department ancillary to the coreshop, and this operation also is controlled by a member of the firm's laboratory staff.

Moulding

Of the five mould-producing units to which reference has already been made, three (Nos. 1, 2, and 3) are served by Nicholls-type jolt/squeeze machines, using moulding boxes of sizes 20 by 17 and 26 by 13 in. Each of these units employs at any given time two pairs of moulding machines and the normal production rates are 280 complete moulds per hr. from each. (Fig. 2 shows a view of the mould conveyors serving these machines.) Standby machines are available ready for use to accommodate pattern changes without loss of production. The fourth unit (No. 4, on the plan Fig. 1), utilizes moulding boxes 42 by 24 in. and from one pair of machines, achieves a production rate of 140 complete moulds per hr. Here also a standby pair of machines is available to facilitate pattern changes. The fifth mould-producer (No. 5, Fig. 1) is a plant arrangement incorporating a "Stationmaster" moulding machine. On this unit, the moulding-box size is 34 by 27 by 9 in. deep and moulds are produced at the rate of 115 per hr., each totalling 9 cwt. This installation was the first automatically operated moulding unit employed at Darcast and has now been in operation for some three years, with complete satisfaction; delay time averages less than one per cent.

Fig. 3 illustrates a section of the Stationmaster unit. The mould-producing machine is of a two-station indexing fully-automatic type, produced by Pneulec, Limited, and is, in fact, the first operational plant made to this design. The machine sequence is as follows: At the first station, boxes are placed over the drag or cope patterns in turn and the

FIG. 1.—*Layout of the Smethwick foundry of Dartmouth Auto Castings, Limited, indicating the main sectional divisions and the grouping of mould-producing units around the melting plant. (Not shown are the stores block, compressor house and sub-station on the left of the site and the general offices and laboratory on the right.)*

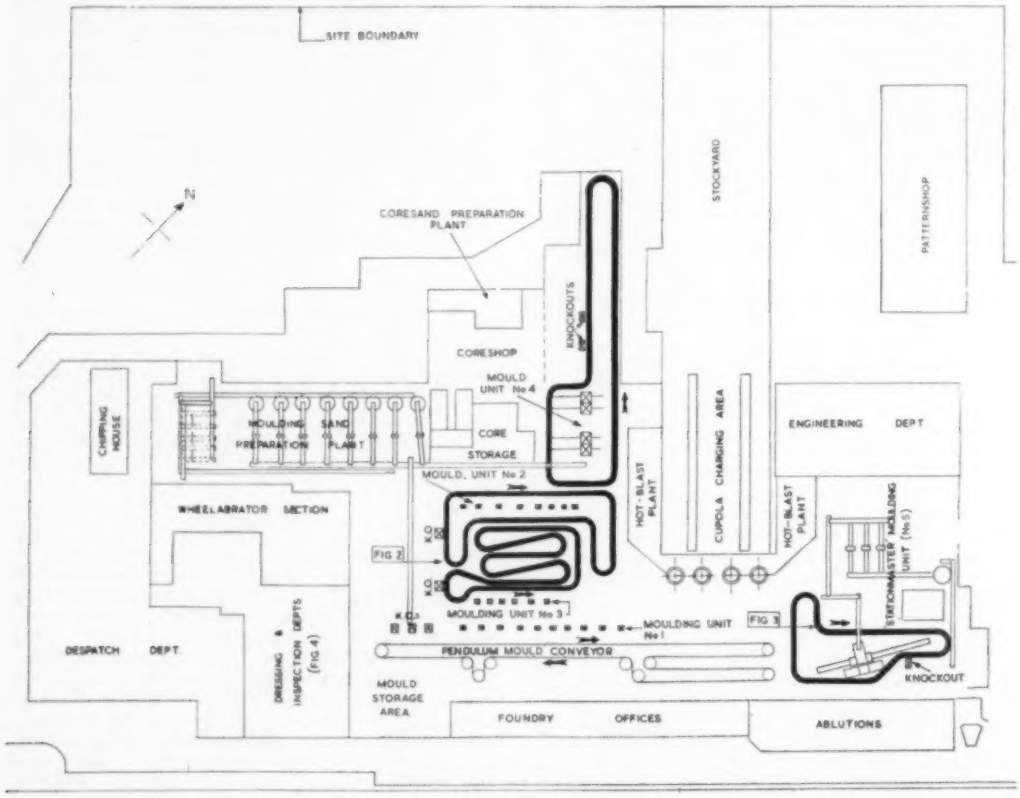

FIG. 2.—*Part of the conveyor serving No. 2 and No. 3 moulding units in the centre of the Darcast foundry. Its rate of travel is 280 plates per hour, equivalent to a cooling time of 12 min. for moulds from each unit.*

machine is indexed. Later, at the same station, stripping takes place of the completed half-moulds after the production sequence is complete. The second station is reserved for filling of the boxes with moulding sand (no facing is used) and for its consolidation by a jolt/squeeze action. All box-parts used throughout the plant are of rolled-steel construction, supplied by Sterling Foundry Specialties, Limited.

Job Allocation

Patterns employed at each of the five mould-production units are to some extent interchangeable, but naturally there is a fair amount of variation in plant and pattern utilization to suit cooling times required and items are also segregated according to box size. The largest runs of components are most frequently produced on units 4 or 5. For example, as many as 16 clutch-pressure-plate castings are produced from one mould on No. 4 unit. The mould unit served by the pendulum conveyor (No. 1) has the longest period between pouring and knockout (23 min. normally), but even longer cooling time can be arranged when necessary. For this purpose, moulds can be off-loaded from the pendulum conveyor, temporarily placing them on roller-conveyor banks adjacent, for an extra cooling period. For example, fly-wheel castings (weighing 150 lb.) are "banked" in this way to give them 40 min. extra to cool. An advantage of this off-loading system is that it is flexible and need only be used for those jobs requiring extra cooling time and thus saves the expense and space which would be entailed in extending the general cooling period—*i.e.*, conveyor length—to suit the jobs requiring maximum time between pouring and knockout. (It is obvious that if such a lengthy conveyor were provided, a large section of it would be unnecessary for the majority of the castings handled in the particular unit.)

Castings Conveyor

Each moulding machine is serviced by the provision of a sand supply-hopper above and a spillage belt below. Castings from the various knockout stations are transported by means of pendulum

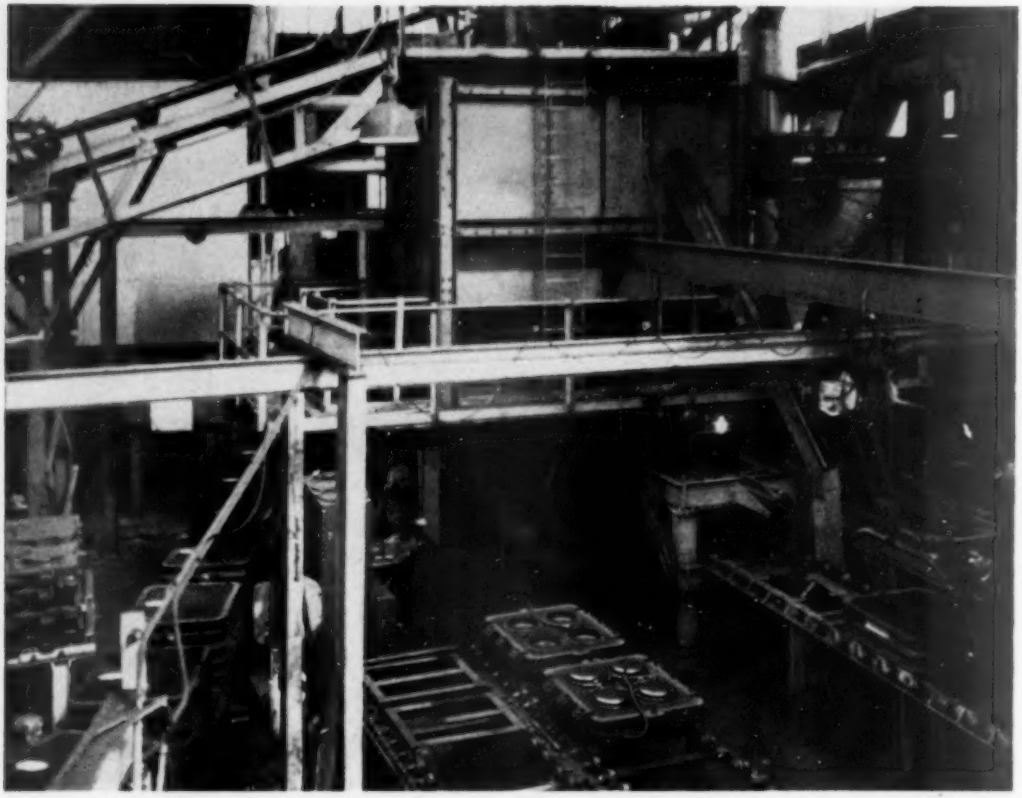

FIG. 3.—*"Stationmaster" automatic unit at the Smethwick foundry. At the top is part of the sand system with its storage hopper over the machine; on the left is a patternplate storage area; in the centre foreground is an electrical patternplate preheating unit and on the right-hand side mould closing is carried out, using hoist and bale carried from a transverse beam. Patternplates can be changed in 10 min., an operation usually carried out during a normal break period.*

bucket conveyors of sufficient length to permit the castings to cool to handling temperature, prior to entering the fettling department. These casting conveyors are not shown in Fig. 1 because they would complicate the illustration too much. Actually, one conveyor picks up castings at the knockouts of units Nos. 2, 3, and 1, and takes them for a two-hour "journey" in a cooling tower before delivering them to a separate section of the foundry appropriately christened the "chipping house." Mould unit No. 4 has its own conveyor system which takes hot castings from the knockout to the "chipping house" over a period of 1½ hours. The return strand of this latter pendulum bucket conveyor picks up all the runners and heads and other discard metal at the "chipping house" and returns the material to the stockyard. Castings from the "Stationmaster" unit are placed in stillages and an elevator-type of platform truck takes these to the fettling shop.

Knockout Ventilation

The ventilation of the vibrating-grid knockouts throughout the plant is performed very efficiently as a result of collaboration with the Foundry Atmospheres Committee of the British Cast Iron Research Association. A large measure of the success which has been obtained with this form of knockout ventilation stems in each case from partial enclosure of the unit. The result is that without restricting working space, extraction rate and air flow at the knockouts has been so disposed that the operators' breathing zone is free from dust contamination.

While dealing with this point, it is notable that Darcast was the first iron foundry to instal a system of continuous dust-sampling throughout the foundry and to produce running graphs of the results.

Box handling and closing on the "Stationmaster" unit is arranged by hoist and transfer bales

(see Fig. 3), and to this extent the plant is not fully automated. On reflection, however, it will be realized that very little labour need be engaged on these operations and in any case core placing is frequently necessary before closing, so that variables encountered if such items were integrated with the mould-producing cycle would be very numerous. The view is held that so much precision movement, if made completely automatic, would entail a vast amount of capital expenditure at the plant and that this would be somewhat out of balance at present with the results which could be secured.

Sand-preparation Plant

Some 350 tons of moulding sand are processed during every hour, the sand being of the synthetic type, using Congleton sand as a base plus Fulbond clay additions. Two groups of sand mills are in use and technical staff, housed in a sand laboratory adjacent to the mills, control sand quality. The eight sand mills of the main plant are of Foundry Equipment, Limited's, manufacture and of the continuous type. They are installed in the separate area shown in Fig. 1, each of them having a Pneulec "Royer" aerator located on the delivery belt for the milled sand. In addition, the "Stationmaster" has its own sand unit, consisting of two August model 3F mills and also incorporating aerators, elevators, bunkers, etc., adequate for processing 150 tons per hour.

In the main sand circuit, as well as that of the "Stationmaster," there is sufficient sand kept in circulation for two hours' supply to the moulding units. This comparatively large quantity is effective in keeping the temperature low in sand reaching the machines. In addition to the period which the sand spends in the bunker, the use of the aerators makes artificial cooling of sand unnecessary. Furthermore, the large bulk (400 tons in the main system) is regarded as important, as it permits the "ironing out" of any irregularities of quality. It is significant that the moulding sand as delivered to the machines has the rather high green-strength of 13 to 14 lb. per sq. in., though it is still very flowable in character—factors which are regarded as a key to the successful moulding of these particular types of castings at very high speeds to give high dimensional-accuracy of products.

Inspection and Fettling Departments

In addition to the full inspection of castings which is arranged in the cleaning and fettling

FIG. 4.—*Part of the dressing and inspection sections, indicating a few of the different types of automobile castings produced. Note the temporary placing of trays of castings on roller tracks.*

departments, there is operated throughout the foundry a system of early inspection of sample castings at the various knockouts. In this arrangement, five per cent. of castings produced are withdrawn at the knockout for visual inspection of quality, the inspectors reporting back immediately to the moulding stations if necessary. In this way, any quality relaxation can be discovered within from 15 to 20 min. of a mould being made. Otherwise, a further two hours' production might be wasted before the first castings reached the fettling-shop inspector, just before they are segregated for despatch.

The first fettling operation is done in the "chipping house." Here, final de-coring takes place and runners are removed and returned to the cupola stockyard, as previously explained. Then all castings are shotblasted prior to the subsequent operations of grinding and chipping. Castings pass from these operations through a "100 per cent." inspection procedure—incorporating the operations of jigging, water testing and Brinell testing wherever necessary and appropriate—and then pass on to the despatch department. The dust-removal arrangements in the fettling shop are most comprehensive and in this department also, the Hexhlet air-sampling devices are in continuous use. (A general view of part of the fettling shop is illustrated in Fig. 4.)

Despatch

Following the inspection procedure, the castings are stacked onto pallets for immediate despatch to the various customers. Despatch is normally effected within 4/5 working hours from the time of pouring. To make such arrangements possible, planning of the load on the production units and all subsequent processing in the works is undertaken in great detail.

Surveying the types of castings currently being loaded for despatch to the country's major automobile manufacturers, the writer was amazed at the great variety even within the fairly narrow range of automobile castings, *i.e.*, flywheels, brake-drums, clutch-plates, exhaust-manifolds, etc. It was also interesting to learn that the increasing adoption of disc brakes by the automobile industry has actually increased the demand on the country's grey-iron foundry industry, as typified at the Darcast plant. It appears that in the new type of brake systems, the drum at each wheel of the older system is more or less balanced by the new requirement of cast discs and there is in addition on each wheel, a pair of caliper-unit castings now almost exclusively produced in grey iron and weighing up to 7-lb. each.

Preventive Maintenance

The foundry is served by its own well-equipped patternshop (and pattern stores), a modern laboratory in addition to stage laboratories, and a comprehensive engineering department.

At this juncture, it is pertinent to record a note about maintenance requirements for the plant and equipment installed at Darcast. A planned schedule has now been compiled for every item, quoting a time in use for every part before it is replaced, *i.e.*, before it actually wears out and gives trouble. This system of preventive maintenance has proved very effective. In addition, a large number of separate units, such as hoists, are duplicated throughout the plant, so that in the event of any unforeseen breakdown, the spare unit can immediately go into service. In the one or two cases—such as the snout-crane for cupola charging, for example—where there is no duplication, a meticulous examination of the equipment is instituted daily because such units are vital to sustained production.

Future

The scene is set at Darcast for a further development stage which is expected to increase the covered floor area by approximately 51,200 sq. ft. At the moment, the main restriction to expanding output is due to the fact that the foundry's total melting capacity is strained to its limit. It is therefore a primary necessity to balance the production programme on all the moulding units to a demand which takes just that maximum amount of molten metal and no more! At present, the total foundry yield per 42-hour working week is about 300,000 castings, produced from approximately 44,000 moulds.

The next stage, for which shop arrangement, site preparation and plant and equipment purchase and construction are already well advanced, will increase production capacity by about 500 tons of castings per week. For this, new hot-blast cupolas are to be installed to give a total melt of 75 tons per hour; and a new stockyard, new cranes and charging equipment will serve this melting plant. There is to be another mould-producing unit on the site of the present patternshop and engineering section—these departments being re-built on other parts of the site. At the conclusion of this work, which is expected to take 12 months and will cost approximately £600,000, Darcast expect to be in a position to cater for the expanding demands of the country's automobile industry and to retain production of a number of kindred lines which have been undertaken.

Acknowledgment

In conclusion, the writer's thanks are due to the directors of Dartmouth Auto Castings, Limited, for permission to publish this article and appreciation to the staff for help in its compilation is recorded.

It speaks volumes for the high degree of work-study and planning at Darcast to find that castings produced at the plant are still warm as they arrive at motor-manufacturers' works, perhaps 100 miles away, just a few hours only after being poured. "Castings on the Move" is perhaps quite an expressive title!

Mould Materials and the Mechanical Properties of Cast Non-ferrous Alloys

*By M. R. Seshadri and A. Ramachandran**

The demands of economy on casting weight and cost, and more-exacting user-specifications, have directed much attention to the subject of material control; so that metallurgical investigation has bulked large in foundry research. Not so much work has been directed to the question of what might be described as "medium" control. Results in this sphere might appear less precise, but undoubtedly have great bearing on the question of casting quality—they also reflect directly on to foundry practice. The following article carries previous work on the subject of mould materials a step further, and will arouse interest both among foundrymen, and those research workers whose attention is engaged in this direction.

Casting soundness is dependent upon a number of variables such as the nature of the metal or alloy cast, properties of the mould material employed, and casting technique. However, the soundness is very much influenced by the properties of the mould materials used. In view of this, various mould materials have been employed by foundrymen for the production of good quality castings in recent years.

There have been several investigations of the effect of mould materials on the casting characteristics of metals and alloys. However, very limited data are available on the effect of mould materials bonded with bentonite and sodium silicate (CO_2 process) on the mechanical properties of cast non-ferrous alloys. A review of the previous work also indicates that not much data are available in the case of metallic moulds.

Hence, experiments were conducted to gain some information on the effect of non-metallic mould materials, such as silica sand, magnesite and silicon-carbide, and metallic mould materials like anodized aluminium and cast-iron, on the mechanical properties of cast non-ferrous-base alloys.

* Of the Authors, M. R. Seshadri is lecturer in the mechanical engineering section and A. Ramachandran is professor of mechanical engineering, both attached to the Indian Institute of Science, Bangalore.

Previous Work

In recent years several investigations have been carried out to study the influence of mould-material properties on the casting characteristics of pure metals and alloys. The results of the experiments conducted by the technical sub-committee of the IBF[1] on cast iron, regarding the effect of mould materials on its mechanical properties and cooling rate, reveal that (1) the properties of cast iron are modified by the variation in the properties of mould material, (2) cooling rate varies with the variation in grain size of the mould material, and (3) cooling rate decreases with the decrease in mould hardness.

Baker[2] has shown that a simple bar casting 1-in. dia. by 11 in. long cast in sand, freezes under unfavourable conditions when a magnesium alloy

TABLE 1.—*Grading and Properties of Mould Mixtures.*

Mould material.	Grading. BS Sieve No.	Grading. Parts by weight.	Bond, per cent.	Moisture, per cent.	Baking treatment.	Density, gm. per c.c. (dry).	Mean heat-diffusivity (calculated).
Silica sand (Bentonite bonded)	30 to 44	11.4	5 (Bentonite)	4	8 hours at 200 deg. C.	1.46	0.017
	44 to 60	37.0					
	60 to 100	40.2					
	100 to 150	11.4					
Silica sand (CO_2)	Same as above		3 (Sodium silicate)	2	,,	1.54	0.020
Magnesite (Bentonite bonded)	30 to 44	11.0	5 (Bentonite)	4	,,	1.60	0.024
	44 to 60	30.5					
	60 to 150	11.2					
	150 to 200	7.4					
Magnesite (CO_2)	Same as above		2 (Sodium silicate)	2	,,	1.69	0.025
Silicon-carbide (Bentonite bonded)	60 to 100	6.8	5 (Bentonite)	4	12 hours at 200 deg. C.	1.65	0.026
	100 to 150	23.0					
	150 to 200	48.6					
	200 to 300	21.6					
Silicon-carbide (CO_2)	Same as above		6 (Sodium silicate)	2	,,	1.74	0.027

Properties of Cast Non-ferrous Alloys

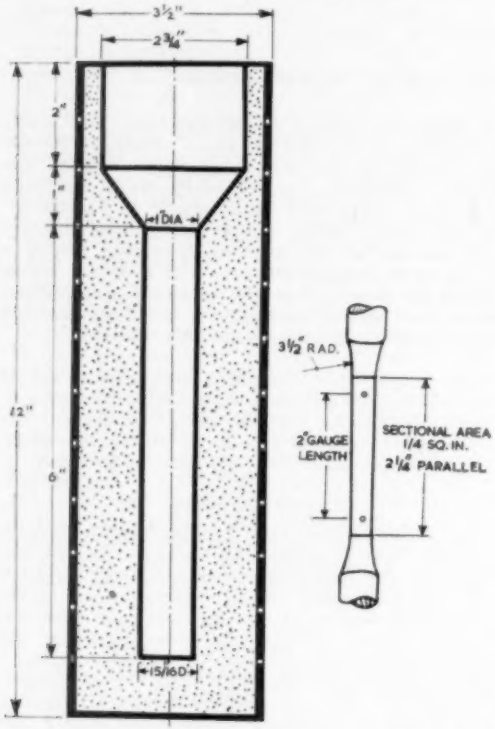

FIG. 1.—*Sketch of DTD test-bar mould and detail of machining dimensions.*

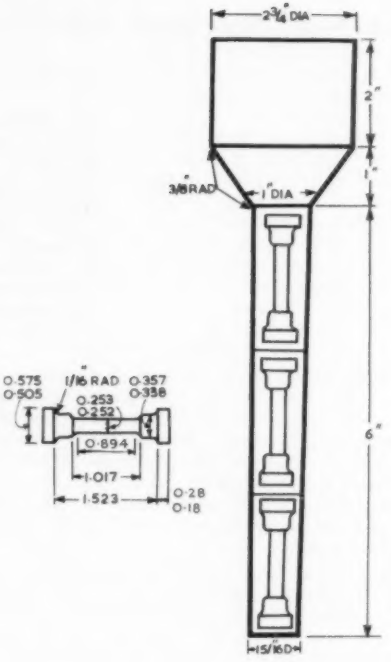

FIG. 2.—*Manner in which three tensometer test specimens were machined from one DTD test-bar and detail of tensometer test-piece dimensions as machined.*

is used, and under relatively favourable conditions when the alloy is aluminium based. According to Ruddle[3], Baker's results suggest that for a given casting shape and a given metal or alloy, the cooling conditions may be made more or less favourable by changing the mould materials.

Glick[4] while studying the influence of silica or zircon sand shells of various thicknesses, backed or unbacked with flint-grit or steel-grit, on the freezing rate and properties of three typical non-ferrous casting alloys, has found that the properties of mould materials to a certain extent affect the properties of the cast alloys.

Recently Jones and Kondic[5] in their investigation of the effect of mould density on the

TABLE 2.—*Results of Mechanical Tests on 2-in. Specimens.*

Alloy.	Mould materials.	Mechanical Properties.	
		Ultimate tensile strength, tons per sq. in.	Elongation, per cent.
LM4 (Cu 2.3 per cent. and Si 5.2 per cent.)	Synthetic sand (dry) ..	8.6	Nearly 3
	Sand (CO_2)	9.1	,, 4
	Magnesite (bonded) ..	9.3	,, 4
	Silicon carbide (bonded) ..	9.7	,, 4
	Magnesite (CO_2)	9.5	,, 4
	Silicon carbide (CO_2) ..	10.1	,, 5
Aluminium-bronze (Fe 3.25 per cent, Mn 0.70 per cent, Ni 1.2 per cent. and Al 11.9 per cent.)	Synthetic sand (dry) ..	37.2	19
	Sand (CO_2)	38.0	22
	Magnesite (bonded) ..	38.6	22
	Magnesite (CO_2)	39.2	21
	Silicon-carbide (bonded) ..	39.6	22
	Silicon-carbide (CO_2) ..	40.8	24
LM6 (Si 12 per cent. modified)	Synthetic sand (dry) ..	12.0	8
	Sand (CO_2)	12.2	8
	Magnesite (bonded) ..	12.8	8
	Magnesite (CO_2)	12.8	7
	Silicon-carbide (bonded) ..	13.0	8
	Silicon-carbide (CO_2) ..	13.2	9
Leaded-tin bronze (Sn 9.8 per cent, Pb 10.0 per cent., Ni 1.0 per cent. and Zn 0.3 per cent.)	Synthetic sand (dry) ..	11.2	Low
	Sand (CO_2)	11.1	Low
	Magnesite (bonded) ..	12.2	—
	Magnesite (CO_2)	11.8	4
	Silicon-carbide (bonded) ..	—	—
	Silicon-carbide (CO_2) ..	—	—

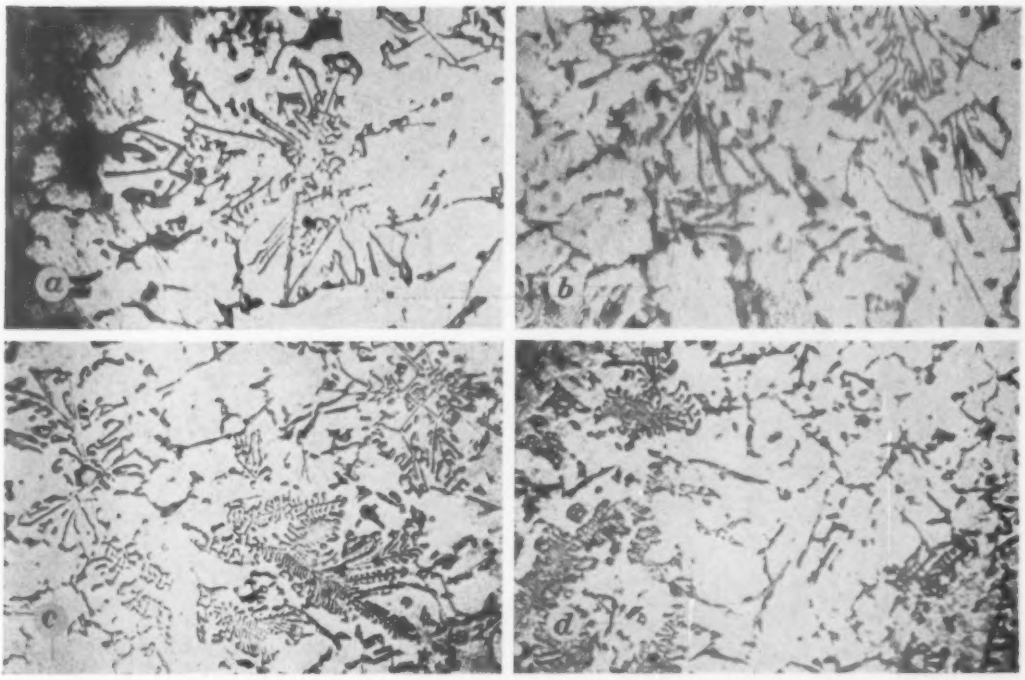

FIG. 3.—*Microstructures of LM4 test specimens cast in various non-metallic moulds; (a) sand mould; (b) sand/CO_2 mould; (c) magnesite/CO_2 mould, and (d) silicon carbide/CO_2 mould. Magnification* ×200 *and etchant* 0.5 *per cent. HF in each case.*

properties of cast alloys, have found that the castings made in sand moulds having different mould densities, will show improvement in mechanical properties with the increase in mould density.

Experimental Details

The alloys examined were LM4, LM6, aluminium-bronze, and leaded-tin bronze. The following non-metallic and metallic mould materials were used:—silica sand, magnesite, silicon carbide, cast iron, and anodized aluminium. The grading of the non-metallic mould materials, and some of the properties of the various mould-mixtures employed for preparing the moulds, are listed in Table 1.

Melting and Casting

The alloys were melted in a forced-draught coke-fired crucible furnace. Aluminium alloys were degassed with nitrogen bubbled through calcium chloride (anhydrous) and carbon tetrachloride for 4 min. at 4 litres per min. Aluminium-bronze was degassed with nitrogen, and leaded-gunmetal was de-oxidized with pelloids. The Al/Cu/Si alloys and Al/Si (12 per cent.) alloys were poured at temperatures ranging from 680 to 700 deg. C, aluminium-bronze between 1,150 to 1,200 deg. C., and leaded-bronze between 1,100 to 1,200 deg. C. The gas content of the aluminium alloys was controlled with the aid of the

TABLE 3.—*Metallic-mould Materials and Mechanical Properties of Cast Alloys.*

Alloy.	Mould material.	Mechanical properties.	
		Ultimate tensile strength, tons per sq. in.	Elongation, per cent.
LM4 (Cu 2.3 per cent. and Si 5.2 per cent.)	Anodised aluminium	11.8	6
	Cast iron	11.9	7
Aluminium-bronze (Fe 3.25 per cent., Mn 0.7 per cent., Ni 1.2 per cent. and Al 11.9 per cent.)	Anodised aluminium	41.3	36
	Cast iron	41.9	30
LM6 (Si 12.0 per cent.)	Anodised aluminium	13.8	9
	Cast iron	13.6	9
Leaded-tin bronze (Sn 9.8 per cent., Pb 10.0 per cent., Ni 1.0 per cent and Zn 0.3 per cent.)	Anodised aluminium	9.6	Low
	Cast iron	10.2	Low

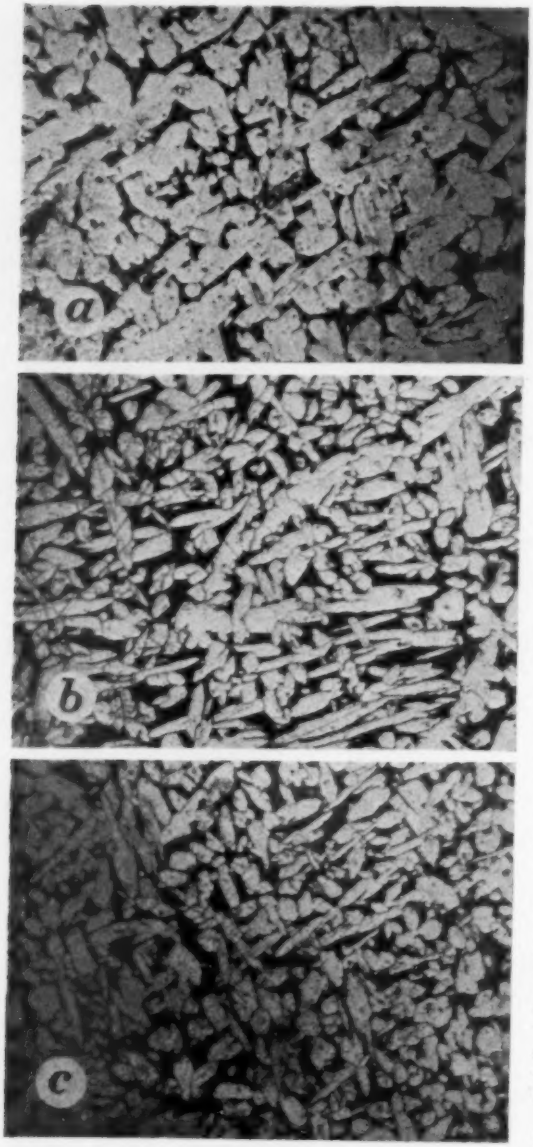

FIG. 4.—*Structures of aluminium-bronze test specimens cast in different types of non-metallic moulds; (a) sand/CO_2 mould; (b) magnesite/CO_2 mould, and (c) silicon carbide/CO_2 mould. Magnification* ×200 *and etchant alcoholic ferric chloride and hydrochloric acid in each case.*

telegas meter prior to pouring into the various moulds. The mould details for casting the test bar of the above alloys are shown in Fig. 1.

In order to evaluate the mechanical properties of these alloys cast in different moulds, 2-in. test specimens were prepared from DTD test-bar castings. Also, three tensometer-test specimens were prepared from each DTD test-bar casting (Fig. 2) to gain information on the scatter in mechanical properties along the height of the test bar, as affected by the mould-material properties.

Non-metallic Moulds

The results of the mechanical tests conducted on the 2-in. test specimens are shown in Table 2. It can be seen that the mechanical properties vary with the mould materials used. Test specimens of LM4, LM6 and aluminium-bronze, cast in CO_2 moulds, show slightly superior properties compared with those cast in bentonite-bonded moulds. This may be attributed to the increase in mould density, or heat diffusivity, since these properties are interrelated. Jones and Kondic[5] have reported that the mould density variation will exert some influence on the mechanical properties of cast alloys.

Attempts were made to correlate the variation in mechanical properties of these non-ferrous alloys cast in different moulds with their macro- and micro-structures. A study of the structures of LM4 test specimens, cast in various moulds (Fig. 3*a*, *b*, *c* and *d*), revealed that the size and distribution of pores, silicon-flake size, and distribution, and grain size are altered by the variation in the properties of mould materials used. The structures of test specimens cast in silicon carbide and magnesite moulds revealed, as shown in Fig. 3*c* and *d*, a reduction in grain size and a considerable decrease in silicon-flake size compared with sand-cast test-specimens. This indicates that the rate of heat extraction is quite appreciable in magnesite or silicon-carbide moulds, whereas it is low in sand moulds. A study of structures of LM6 alloy also showed variation with the type of mould material used.

In the case of aluminium-bronze test specimens the amount of equi-axial and columnar grains was found to vary with the type of mould material used. In addition to this, the structures of aluminium-bronze test specimens cast in different moulds revealed variation in the shape and size of α and $\alpha + \delta$ eutectoid-phase corresponding with the variation in mould material properties. Figs. 4, a, b, and c show the variation in microstructure of aluminium-bronze cast in sand (CO_2), magnesite (CO_2), and silicon-carbide (CO_2), moulds.

The test results with leaded-tin bronze, cast in various moulds as shown in Table 2, were not consistent, and not much of improvement was observed in the mechanical properties with the variation in properties of mould materials used. This might be attributed to the percentage of porosity, and its distribution, in the test castings as revealed by metallographic examination.

Metallic Moulds

In Table 3 are presented the mechanical properties of test specimens cast in metallic moulds, such

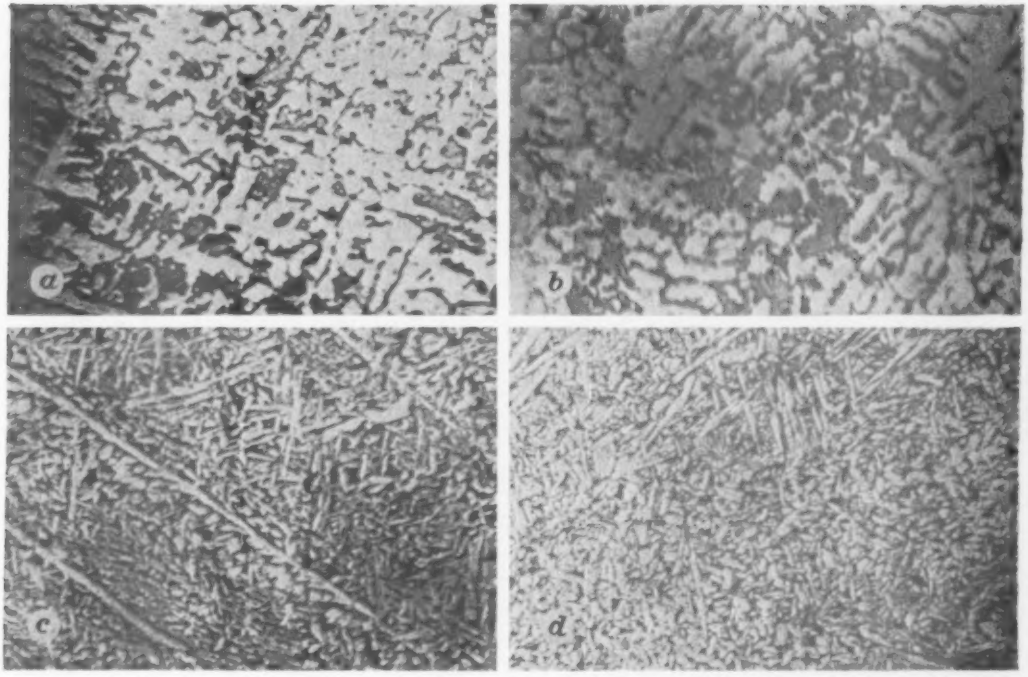

FIG. 5.—*Structures of test specimens cast in metallic moulds; (a) and (b) LM4 alloy cast in (a) a cast-iron mould and (b) an anodized aluminium mould; (c) and (d) are of aluminium-bronze alloy, (c) cast in a cast-iron mould and (d) in an anodized aluminium mould. All magnifications* ×200, *(a) and (b) etched in 0.5 per cent. HF and (c) and (d) in alcoholic ferric chloride and hydrochloric acid.*

as cast iron, and anodized aluminium. It can be seen that the properties of test specimens of a given alloy cast in these metallic moulds will be more or less the same, and the difference in the properties of anodized aluminium and cast-iron moulds appears to have no appreciable effect on the alloys cast. As shown in Fig. 5 *a, b, c* and *d*, not much variation in the microstructures of test specimens cast in these metallic moulds was observed, thus indicating that the properties of test castings cast in these metallic moulds will be more or less the same.

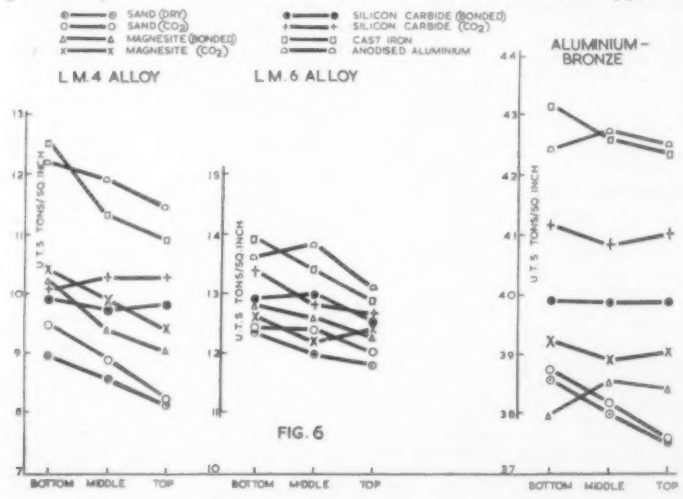

FIG. 6

Tensometer Tests

In Fig. 6 is shown the variation in mechanical properties along the height of the DTD test-

FIG. 6.—*Variation in mechanical properties of specimens machined from different positions vertically in DTD test-bars (as revealed by tensometer tests).*

bar as revealed by the tensometer tests. It can be inferred from this Fig. that the scatter, in mechanical properties, is less in narrow-freezing range alloys, and slightly more in long-freezing range alloys. This tendency appears to be greater in chill-cast test-specimens. This may be attributed, as reported by Baker and Ruddle[6], to the magnitude as well as the direction of the temperature gradients set-up during the solidification process of the DTD test-bar, which in turn, affects the mechanism of feeding.

Tensometer tests also reveal that the mechanical properties of the alloys cast vary with the mould materials used. This indicates that even the core portion of the DTD test-bar is to a certain extent influenced by the properties of the mould materials employed for preparing the moulds.

Conclusions

The results of the above experiments reveal that:—(1) The mechanical properties of the cast alloys studied are influenced by the variation in mould material properties. (2) In general test specimens cast in CO_2 moulds have better properties compared with bentonite-bonded moulds. (3) Test specimens cast in silicon-carbide or magnesite moulds have better properties compared with those cast in sand moulds. (4) Amongst metallic-mould materials anodized aluminium, and cast iron, have more or less the same influence on the properties of the alloys cast.

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[3] R. W. Ruddle. "Solidification of Castings," second edition (1957), 365.
[4] W. W. Glick. *Brit. Foundryman*, Jan. (1960), LIII, Pt. 1.
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[6] R. W. Ruddle. "Solidification of Castings," second edition, 1957, 297.

Parkfield Foundries

A company has been formed as a private limited-liability company and registered under the name "Parkfield Foundries (Tees-side), Limited," Bowesfield Lane, Stockton-on-Tees. It will take over the Ashmore, Benson, Pease foundry as a going concern and arrangements are being made for the assignment of existing contracts to the new company. Within the next two to five years the company will obtain possession of all the factory buildings and the offices at the Parkfield East Works, to enable it to develop activities in the production of castings by the Meehanite process and also spheroidal-graphite iron castings. Arrangements are being made for the licences currently held by Ashmore's for these processes, to be transferred to the new company.

The first directors of Parkfield Foundries (Tees-side), Limited are: Mr. G. T. Cantlay, chairman, the hon. Anthony Berry, Mr. E. K. Gould and Mr. G. Hobman. Mr. G. B. Taylor, who has been sales manager of Ashmore's works division, and formerly foundry manager of their foundry for 15 years, has been appointed managing director of the new company. Parkfield will offer employment to most of the staff and workpeople at present engaged in the foundry, and will require to recruit additional moulders and patternmakers immediately to deal with an expanding volume of work. It is expected that the new company will commence trading on February 13, 1961.

Engineering Marine and Welding Exhibition, 1961

The above exhibition will be held once again at Olympia, London, this year. It will be open to the public on Thursday, April 20, for two weeks until Thursday, May 4. Formal visits will be made by the following organizations representative of sections of the foundry industry:—Institute of British Foundrymen, Thursday, May 4; National Society of Master Patternmakers, Wednesday, April 26; Foundry Trades' Equipment and Supplies Association; Monday, April 24; Council of Ironfoundry Associations, Tuesday, May 2.

Mr. E. AYRES of Millspaugh, Limited, left by air for the United States last week for a business visit lasting about a fortnight.

Market Development for Iron Castings

The CFA Council, with the agreement of the Joint Iron Council, has decided to implement a new market-development policy based broadly on suggestions originally put forward by the National Federation of Engineering and General Ironfounders. The proposals envisage bringing to the forefront the technical merits and possibilities of iron castings and the existing "machinery" and services of the Council of Ironfoundry Associations will be used for this purpose. To achieve success will involve much hard field-work of a highly technical and expert kind, the end-product of which would be to provide technical information and data of such quality as to command the consideration and respect of engineers and designers. For this purpose a staff appointment will soon be made.

It has been agreed that the proposal shall be given effect with the least possible delay and at a recent meeting, the Council set up an *ad hoc* committee to put the scheme in motion and supervise the initial stages. This committee consists of the chairman of the CFA, Mr. Malcolm J. Glenny, who presides, Mr. D. Graham Bisset (who presided over the NFEGI committee which initiated the original proposals), Mr. E. K. Gould, Mr. M. M. Hallett, Mr. R. A. S. Lomax and Mr. C. G. Mackie.

The scheme is intended to be for the benefit of the iron industry as a whole, both founders and iron producers. No sensational features are envisaged in the working out of the proposals, as scheme will depend to a large extent on what may well be a period of some months for preliminary investigaiton and research. The results and effects will thus become apparent gradually.

Credit-line Corrected

We are asked to point out that the name of the manufacturers of the castings illustrated in the Harborough Construction Company Limited's advertisement in the JOURNAL of January 5 should have been given as Cradley Chain & Castings, Limited. It is regretted that, due to a printing error, another foundry's name was quoted. Apologies are extended to both firms for any inconvenience caused and to readers who were confused. (The advertisement appeared in its correct form in last week's issue.)

National College for Foremen?

Proposals for a national foremen college were made at the end of last month by Mr. D. B. Beynon, personnel officer of F. H. Lloyd & Company, Limited, steelfounders and engineers, addressing a conference at the Connaught Rooms, London, on foreman training, organized by the British Institute of Management, and attended by about 170 delegates.

Mr. Beynon said there was a national shortage of foremen of the right calibre and that industrial expansion was increasing the need for specialist supervisors. It was sometimes thought at present that foremanship was a dead end. Although foremanship training was not easy, the position was simplified when the job was regarded as a skilled occupation and an intermediate step on the ladder towards management.

Mr. Beynon suggested that a national foremen college could advise companies how training might be promoted internally; it could act as a central authority for information, award a nationally recognized diploma, and operate "sandwich" courses which allowed trainees sufficient time to "keep both feet on the ground."

Mr. Beynon concluded by recommending the conference to establish a committee for examining the status and training of foremen which could put forward suitable recommendations "to the appropriate authority in due course."

Shop-stewards

The neglected need for training foremen was also stressed by Mr. B. H. Dyson, a former director of Hoover, Limited, but he believed that selection was even more important. "Management must cast its net very much wider than is normally done and there must be a definite policy of promoting and interchanging potential foremen over the whole industrial sphere," he said. Mr. Dyson asked delegates whether they had ever reviewed the potential talent of foremanship among shop stewards. He stated that in his experience some of the best foremen/managers had been drawn from their ranks.

Mr. D. W. Cole, of the Ministry of Power, considered that no difficulty would be experienced in obtaining or keeping foremen if the way was open for the lowest to become the highest. "I am convinced that in well-established processes good foremen can take over responsibilities which in the early days of the process were necessarily carried by professional staff." Again referring to the need for greater training, Mr. Cole agreed with Mr. Beynon that an approach should be made to the Ministry of Education so that there were set up training courses for potential foremen.

Leipzig Spring Fair

The 200 British firms who will be exhibiting at the Leipzig Spring Fair will make Britain the largest foreign participant outside the Eastern European area. The main British exhibits include steel, rolled-steel goods, textiles and textile machinery, electronic equipment, building and chemical plant, furniture, cameras, television equipment and tractors. It is reported that applications for space have been so great that East German exhibitors have had to considerably reduce their demands in order that requirements from abroad can be met. More than one quarter of the total area of 3,300,000 sq. ft. has been made available for foreign exhibitors. The Fair will be open for ten days commencing March 5.

English Steel Corporation's Developments

"Any one of the furnaces we put in will have an output in excess of 50 per cent. more than any of our existing range of furnaces," stated Mr. F. S. Beale, a director of the English Steel Corporation, Limited, Sheffield, when he spoke at a works dinner of the Corporation's £30,000,000 Tinsley Park development scheme. He said that three 100-ton electric melting furnaces were nominally planned for the scheme. New techniques would have to be introduced for handling material into the plant and for getting it away, and also for those operating the plant. Mr. Beale went on to say that this year the company had started with a better load of work than in 1960. Although orders were not coming in quite so fast as they were a few months ago, on the whole prospects for 1961 were cheerful. The only doubtful aspect was the motor industry. Even here there was no reason to be despondent so long as the forecasts of those in the industry were reasonably correct, and it started picking up towards midsummer. If it did not it might be necessary to deploy some labour as happened a few years ago, fortunately without any redundancy.

Davy-Ashmore Company to foster Overseas Sales

A new subsidiary, the Davy-Ashmore Export Company, Limited, has been formed by the Davy-Ashmore, Limited, group, to manage and develop the overseas selling and engineering organization and to promote a further extension of the group's export trade in capital goods. The main activities of the group are in the fields of iron and steel, chemical, petrochemical, gas, and petroleum engineering. The subsidiary will operate from 15, Portland Place, London, W.1.

Directors of the new company are Mr. M. A. Fiennes, chairman, Mr. D. L. Campbell, managing director, Mr. D. M. R. Brown, Mr. M. F. Dowding, Mr. T. K. Hargreaves, Mr. C. Robson, Mr. R. W. Rutherford, Mr. H. M. Sutherland, and Mr. H. H. Utley, Mr. L. Davis is secretary.

The Davy-Ashmore group includes Ashmore, Benson, Pease & Company, Limited, Davy & United Engineering Company, Limited, Davy & United Instruments, Limited, Davy & United Roll Foundry, Limited, the Power-Gas Corporation, Limited, Rose, Downs & Thompson, Limited, and associated overseas companies.

New Foundry for Ashwell & Nesbit

Ashwell & Nesbit, Limited, Barkby Road Works, Leicester, wellknown as makers of underfeed mechanical stokers and semi-rotary pumps, have also concentrated for many years on the production of high-quality castings for the machine-tool industry. As a result of success in this field it has been necessary to enlarge the foundry. Richards Structural Steel Company, Limited, of Leicester, who have during the past five years executed several orders for foundry plant for Ashwell & Nesbit, are being entrusted with the contracts for the new building, cranes and various items of sand-handling plant for this new project.

CEMENTATION COMPANY, LIMITED—Sir Frederick A. Pile has been elected chairman in succession to Mr. A. R. Neelands, who has become president.

Notes from the Branches

Sheffield

The Sheffield and district branch of the Institute of British Foundrymen held their annual dinner at the Royal Victoria Hotel, Sheffield, on Monday, January 30. It was an "all male" gathering, attended by 400 members and guests. After "The Queen," proposed by the branch president, Mr. J. H. Pearce, "Civic Greetings" were given by the Lord Mayor of Sheffield, Alderman Harold Slack, M.B.E., J.P. Saying that the function was the largest regularly held in Sheffield, he continued in a humorous manner quoting the City's motto interpreted loosely as "With the help of God, we shall make a profit" as one of the business aims of many who were present.

The next speaker was Admiral Sir Michael M. Denny, G.C.B., C.B.E., D.S.O., R.N., chairman of Cammell Laird & Company, Limited, who proposed the toast of "The Foundry and Allied Industries of Sheffield and District." Describing himself as a relative newcomer to Sheffield industry, the Admiral paid a tribute to basic engineering and particularly foundrywork as being an excellent background to a career in the Navy, although naval operations might be described, in essence, as that of "destroyers" of steel. The response to this toast was given by the Master Cutler, Mr. C. H. T. Williams who quoted many of the City's historical associations with the foundry industry, in particular the work of Roper who had been associated with Abraham Darby in early development of iron-founding.

To Dr. R. V. Riley, B.SC., F.I.M., senior vice-president of the branch, fell the difficult job of proposing the toast to "The Guests." However, he accomplished the task in an admirable manner, the list of distinguished personages including Mr. R. S. Bruce (president, Sheffield Chamber of Commerce), Sir Robertson King, K.B.E. (chairman, the Electricity Council), Mr. P. J. C. Bovill, J.P. (managing director, Newton Chambers & Company, Limited), Mr. A. J. N. Brown (president, Association of Bronze & Brass Founders), Dr. C. J. Dadswell, M.I.MECH.E. (managing director, English Steel Castings Corporation, Limited), Mr. T. C. Firth (chairman, Brightside Foundry & Engineering Company,

Photographs taken at the annual dinner at the end of last month of the Birmingham branch of the Institute of British Foundrymen, held in the Botanical Gardens, Edgbaston. The picture below shows (from left to right) the chief guest, Mr. John Osborn, M.P., and Mrs. Osborn; Mr. G. R. Shotton, F.I.M., (IBF national president); Mr. M. M. Hallett, M.SC., (Birmingham branch president); Mrs. Hallett, and Mrs. Shotton. The second photograph is of Mr. and Mrs. D. A. Richards (senior vice-president, IBF) (left) being received, before the dinner; number three shows Mr. Shotton being "decorated" by the branch secretary, Mr. A. J. Crook, and in the fourth, Mr. H. Morrogh (director, British Cast Iron Research Association) with Mrs. Morrogh on his right are being greeted by Mr. and Mrs. Shotton.

The Lancashire branch, IBF annual dinner was held at the Grand Hotel, Manchester, on the evening immediately following the Birmingham party. As shown in the photograph, above, the reception party included (left to right) Mr. and Mrs. G. R. Shotton, Mr. F. W. Nield (branch president) and Mrs. Nield; Mr. D. A. Richards and Mrs. Richards; Mr. A. J. N. Brown (president of the Association of Bronze & Brass Founders) and Mrs. Brown. In the second picture are Mr. F. A. Harper (toastmaster), Mr. J. J. Harvey, and Mr. G. Walker (reception stewards), and Mr. H. Booth (past branch president), and Mr. H. Buckley (branch secretary).

Limited), Mr. R. G. Heawood, M.A. (Vicar of Christ Church, Dore), Mr. J. Hiles, M.SC. (principal, Sheffield College of Technology), Mr. H. Humphries (deputy chairman and managing director, Hadfields, Limited), Mr. S. W. Martin (chairman and managing director, Staveley Iron & Chemical Company, Limited), Mr. W. D. Pugh, A.MET., F.I.M. (managing director, English Steel Corporation, Limited), Mr. J. E. Russell, M.A. (president, Sheffield Metallurgical Association), Mr. H. W. Secker, O.B.E. (chairman, Thos. W. Ward, Limited), Mr. J. F. Stanier (president, National Trades Technical Societies), Mr. G. R. Shotton (president, Institute of British Foundrymen). The reply to the toast of "The Guests" made by Mr. W. F. Cartwright, D.L. (president, Iron and Steel Institute), concluded the formal proceedings. The president thanked the local secretary, Mr. R. Wright and his helpers for organizing the function so efficiently and then intimated that members and guests were free to mingle informally, meeting old friends and making new ones among the assembly.

Southampton

A change in the programme announced for the Southampton section of the Institute is to the effect that owing to the attendance of Dr. H. T. Angus at an international meeting, he will be giving his lecture on "Development of Cast Metals" on March 1 instead of April 26 as originally arranged. Mr. W. B. Parkes who was to have been the lecturer at the March 1 meeting on "Foundry Sands and Moulding Materials" will now present this paper to the April 26 meeting. The annual general meeting of the section will still be held on April 26, prior to Mr. Parkes's lecture.

Chemical Society's "Anniversary" Meetings

Sheffield will be visited for the first time by the Chemical Society of London when they hold their 1962 "Anniversary Meetings" at Sheffield University for three days in April. Members taking part will be shown round the works of a number of local industrial firms, and there will be an official civic reception and dance for the Society at the Town Hall. The three symposia for the meetings will be concerned with physical, organic and inorganic chemistry. (The Society was founded in 1841 and is believed to be the oldest in the world.)

"Golden Eye" Club

A quite exclusive club—the "Golden Eye" Club—was launched in London last week when the five founder-members were enrolled at a ceremony during a Press conference at the Charing Cross Hotel, London. Each received a lapel button and membership certificate from Sir Howard Roberts, president of the Royal Society for the Prevention of Accidents, who originated the idea. Admission to the club is reserved only for those who, by wearing goggles at work, have escaped blindness or serious injury to their eyes.

Amongst the five men was 21-year-old Mr. Colin Umney, who works as an iron moulder with the Staveley Iron and Chemical Company, Limited, Chesterfield. He was standing near a mould which was being cast with molten metal, ready to skim off the floating slag, when the top of the mould erupted into his face. Although he had other injuries his eyes were protected by goggles.

Another founder-member admitted was Mr. James Gilbert, 40, who has been employed as a turner by Owen Dyson, Limited, a branch of the United Steel Companies, Limited, for over 24 years. He was machining a railway-wagon axle when a piece of hot swarf struck his safety spectacles with such force that it embedded itself in the left-hand side-shield. "I should have lost an eye if I had not been wearing glasses," said Mr. Gilbert.

If the new club does help to make the use of goggles more popular it will be doing very good work.

New Officers of the Institute of Metals

Head of the department of metallurgy at the University College of Swansea, University of Wales, Prof. H. O'Neill has been elected president of the Institute of Metals. The Earl of Verulam, who succeeded the late Earl as chairman of Enfield Rolling Mills, Limited, in November last, has been elected senior vice-president for the year 1961-62. Prof. O'Neill succeeds Sir Ronald Prain, chairman and president of the Rhodesian Selection Trust, Limited.

Deputy chairman and managing director of Telecon Metals, Limited, Mr. W. F. Randall has also been elected a vice-president. Mr. N. I. Bond-Williams, managing director of the Aston Chain & Hook Company, Limited, Prof. A. H. Cottrell, FRS, Goldsmiths' Professor of Metallury at Cambridge University, and Mr. G. A. Rider, deputy managing director of Birmid Industries, Limited, have been elected ordinary members of the council.

Davy-Ashmore Board Changes

In order to make room for promotion, Sir Walter Benton Jones, chairman of the United Steel Companies, Limited, has retired from the board of Davy-Ashmore, Limited. Mr. M. F. Dowding, general manager of the machinery division of the subsidiary, Davy & United Engineering Company, Limited, has been appointed to the board of the parent company.

As agreed in principle at the time of the Davy-Ashmore merger, Mr. C. E. Wrangham, formerly chairman of Ashmore, Benson, Pease & Company, Limited, and of P.G. Engineering, Limited, has resigned from the boards of these subsidiaries and Mr. M. A. Fiennes has been appointed chairman in his place. Mr. Fiennes is the managing director of Davy-Ashmore.

Sheffield Technical Education

"If we are to match up with the challenge of the modern age, we must revive interest in the necessity for trained minds, and persuade our young folks to take the opportunity of further training," said Alderman A. Ballard, chairman of Sheffield Education Committee, at a meeting in Sheffield Town Hall on January 27 to discuss a comprehensive programme for Sheffield's Commonwealth Technical Training Week. The meeting was attended by heads of industry, commerce and youth organizations. Alderman Ballard said the week would aim to "revive and stimulate interest" in the necessity for trained minds in a technical age.

The Lord Mayor of Sheffield, Alderman Harold Slack, said, "It is futile for us to continue as we have been doing in this country. We have had a lack of skilled labour for many years, and are very much behind in technical training compared with other countries. But provision is being made to rectify this, and I think we shall see something very different for the young people of Sheffield." Sir William Garrett, a member of the Central Advisory Committee for the Commonwealth Technical Training Week, emphasized the rapid changes in industry. He said, "Instead of the man wielding a pick and shovel, we need men to handle mechanical machines. In 20 years from now, opportunities for the unskilled man will be scarce."

Preliminary items discussed for the week include open days at technical training institutions, a careers convention, films, demonstrations, lectures, and the opening of the new Granville College.

Edward Matthews' Extensions

Work has just commenced on the building of a new office-block and pattern-stores for Edward Matthews, ironfounders, of Bilston, Staffordshire. When completed, the office block will comprise a two-storey building in modern style with provision for all clerical and administrative functions. Special attention will be paid to the layout and lighting so that whilst obtaining maximum efficiency they will also provide the staff with the best possible working conditions. It is intended to instal under-floor heating, which it is believed will ensure an even temperature in all seasons.

The new building, standing back from the main road, will overlook a sizeable lawn and well-kept rose-beds. The company hopes that the offices will be ready for occupation towards the end of the summer and that when the staff move from the present office-building this will give an opportunity for further reconstruction and increase in productive capacity.

Visitors are at all times welcome and it is particularly hoped that when the new offices are complete, as many friends in the trade as possible will take an opportunity of viewing them.

Latest Foundry Statistics

Light-alloy Castings: The Ministry of Aviation has issued simultaneously output figures for aluminium-alloy castings during October and September, 1960. In October, production of these castings from sand moulds was 1,828 tons (in September, 1,667 tons); as gravity-die castings 4,829 tons (4,967); and as pressure-die-castings, 2,032 tons (2,476). The output of magnesium castings was 201 (203) tons.

Personal

Dr. P. G. McCarthy has been appointed a director of British Titan Products Company, Limited.

Mr. Glyn Mitchell has been appointed to the board of Pratt Precision Hydraulics, Limited.

Viscount Ward of Whitley has joined the board of Horseley Bridge & Thomas Piggott, Limited.

Mr. L. Boddington and Mr. R. Hafner have been appointed directors of Westland Aircraft, Limited.

Mr. James Winstanley has been appointed general overseas manufacturing manager of F. Perkins, Limited.

Mr. Charles F. Dickson, a director of Crompton Parkinson, Limited, since 1939 has been appointed a vice-chairman.

Mr. J. S. Turnbull has resigned from the board of directors of Lake & Elliot, Limited, founders and engineers of Braintree.

Mr. Ll. Young, formerly general manager, has been appointed director of engineering of Bailey Meters & Controls, Limited, of Croydon.

Alderman J. W. Sterland, chairman of Sheffield Town Planning Committee, has been appointed a part-time member of the Yorkshire Electricity Board.

Mr. A. E. Rothwell has been appointed assistant secretary of Firth-Vickers Stainless Steels, Limited, Sheffield. Mr. J. Cunningham has been appointed buyer.

Mr. J. Douglas Latta has been appointed a director of Alex. Ferguson (Engineers & Brassfounders), Limited, a subsidiary of Grampian Holdings, Limited, Glasgow.

Dr. I. S. Wilson, a member of the technical staff of Monsanto Chemicals, Limited, has been appointed to the newly-created position of senior scientist of the company.

Mr. W. M. Chapman-Walker has been appointed a director of Aerialite, Limited. He has been associated with the company as part of its London organization for a number of years.

Mr. T. V. Emmerson has been appointed deputy chairman of Chamberlain Consolidated, Limited, the parent company of the Chamberlain group of building, engineering and property companies.

Mr. A. L. Stewart has retired after 50 years' service as a moulder, patternmaker and latterly senior foreman at the Lion Foundry, Kirkintilloch, near Glasgow. The directors have presented him with a cheque.

Mr. B. Hilton has been appointed deputy managing director of Tweedales & Smalley, Limited, textile-machinery manufacturers, Castleton (Lancs). Mr. K. S. Campbell has joined the firm as an additional sales director.

Mr. Ambrose Hunter has been appointed a director of Lithgows, Limited, shipbuilders, Port Glasgow. He is managing director of William Hamilton & Company, Limited, shipbuilders, Port Glasgow, an associate of Lithgows.

Mr. W. N. Menzies-Wilson has been appointed a director of the Staveley Iron & Chemical Company, Limited, and as from May 1 will be deputy managing director. Mr. S. W. Martin remains chairman and managing director.

Sheffield Stock Exchange at their annual meeting elected Mr. J. N. Shillito as chairman, and Mr. J. C. Barber as deputy chairman. Elected to the committee were Mr. R. O. Wever, Mr. A. Guy Wall and Mr. W. D. Mather.

Mr. Kenneth G. Holden has been appointed to the board of Borax (Holdings), Limited. He is chairman and joint managing director of Hardman & Holden, Limited, chemical manufacturers, which was recently acquired by Borax.

Sir Joseph Latham, who retired as deputy chairman of the National Coal Board last year, has been appointed director of finance of Associated Electrical Industries, Limited. Sir Joseph is a director of George Wimpey & Company, Limited.

Mr. Malcolm T. Rimmer has been appointed secretary and accountant of Fawcett Preston & Company, Limited, of Bromborough, and secretary of the New Eagle Foundry Company, Limited, of Birmingham, both members of the Metal Industries group.

Mr. Clifford Shaw, of Zirconal, Limited, and Shaw Processes, Limited, left on February 5 for a visit to licensees in Israel, India and Australia. He will return *via* the USA where he will visit licensees in San Francisco, Los Angeles and the eastern seaboard.

Mr. Rodney Kent has been appointed deputy chairman and Mr. Walter May assistant managing director of George Kent, Limited. Mr. John G. Vaughan, managing director of the Charterhouse Finance Corporation has been appointed a director of the company.

Mr. T. R. Craig has been appointed chairman of B.I.S.C. (Ore), Limited, in succession to Mr. C. R. Wheeler, who has resigned from the chairmanship but remains on the board. Mr. B. Chetwynd Talbot and Mr. T. B. Roddy have been appointed to the board.

Mr. J. P. Hatfield, formerly a director of the Gate Machinery Company, Limited, Acton, London, W.3, has been appointed a director of the Frye Machine Tool Company, Limited, and also of the associated company, Times Machinery Company, Limited, both at Slough.

Mr. William T. B. Wild, who retired from the post of manager of the general engineering division in Leeds, of Mather & Platt, Limited, on December 31, was presented with a silver tea-service to mark his retirement at a dinner at Manchester on January 27. He had been with the company for 48 years.

Mr. Kenneth Brinsmead, B.Sc., formerly project leader at the Morgan Crucible Company's research department, has been appointed general manager of the Zirconal Development Corporation in the USA. After a training period in the parent company's works he will take up his appointment in Port Washington, Long Island.

Managing director of J. Blakeborough & Sons, Limited, Brighouse, Mr. W. Ralph Blakeborough was one of the recipients of recent long-service awards. He has been associated with the company for 40 years. Awards for 50 years' service were presented to two employees; for 40 years to 11 people; and to 25 workers with 25 years service.

Mr. R. S. H. Capes has retired after 27 years as secretary of Dorman Long & Company, Limited, which he joined in 1923. He is succeeded by the assistant secretary, Mr. J. M. Armstrong. Manager of the company's Cleveland works for the past eight years,

Personal

Mr. PERCY WOOLAS has also retired. He joined the company in 1911 and was appointed assistant works manager at Cleveland in 1949.

Dr. W. S. WALKER has joined the board of Campbell Gifford & Morton, Limited, consulting engineers, Weybridge. He has been with the Round Oak Steel Works for 10 years, and was previously with Thos. Firth & John Brown, Limited, Sheffield. Dr. Walker has served on the Council of the British Iron and Steel Research Association and is an honorary member of the Council of the Iron and Steel Institute.

Kestner Evaporator & Engineering Company, Limited, follow the appointment of Mr. B. N. REAVELL as chairman by that of Mr. G. H. BLACK as managing director. Mr. W. S. KNIGHT who has retired after being director and secretary for 47 years is succeeded by Mr. C. A. PITHER. Mr. J. W. GROSE continues as an executive director. The retiring chairman, Mr. J. ARTHUR REAVELL, becomes president.

The Rev. KEITH SEYMOUR, a chaplain with the Royal Navy for the past seven years, has been appointed commissioner of staff training and warden at the Hesley Wood scout training centre. Chapeltown, Sheffield, where Sir Harold West, Scout Commissioner for South Yorkshire, and former managing director of Newton Chambers & Company, Limited, has acted as honorary warden for three years.

Mr. J. L. DELL has been appointed chief test pilot of English Electric Aviation, Limited. He succeeds Mr. R. B. BEAMONT, who has taken up his new post as deputy chief test pilot of British Aircraft Corporation, Limited. Mr. Beamont will continue to be manager of flight operations and a special director of English Electric Aviation, Limited. He will be responsible for the flight testing of the TSR-2 supersonic low-level strike and reconnaisance aircraft.

Mr. HARRY RICHARDS, chairman of Wolf Electric Tools, Limited, London, W.5, has retired after 53 years' service. He joined the company in 1907 as service manager, and after holding various executive positions, was appointed to the board in 1926. In 1932 he became works director of the first Wolf factory; the managing directorship was conferred upon him in 1933, and he became chairman in 1951. Mr. Richards retains his seat on the board of Wolf Electric Tools (Holdings), Limited.

Mr. W. J. MCBRIAN, chairman and managing director of the Caterpillar Tractor Company, Limited, is returning to the US in March to resume his duties as a vice-president of the parent company, Caterpillar Tractor Company, Peoria, Illinois, and to take up an important position in the company's world-wide operations. Succeeding Mr. McBrian as chairman and managing director of the UK company is Mr. M. A. CLEMENTS. He was managing director of Caterpillar of Australia Pty., the company's Australian subsidiary in Melbourne.

Mr. JAMES BUTLER, chairman of the Butler Machine Tool Company, Limited, Halifax, reports the order book is still at a high figure. He attributes a substantial drop in trading profit to a number of factors including the cost of exhibiting in London and Chicago and to development work which has led to loss of output. Recommended dividend on Ordinary shares for the year is 17½ per cent., which though not fully earned in the trading profit is regarded as justified in view of a special dividend from trade investment.

Company News

BIRMINGHAM SMALL ARMS COMPANY, LIMITED—Offers made to acquire the preference and ordinary capital of the Churchill Machine Tool Company, Limited, are now unconditional. They remain open for acceptance until further notice.

COZENS & SUTCLIFFE (HOLDINGS), LIMITED—Offer of 653,788 4s. ordinary shares to shareholders at 10s. 6d. each has been taken up to the extent of 96 per cent. of the issue. Of the remaining shares, applications for up to 34 shares were allotted in full and applications for over 10,000 shares will get approximately 16 per cent. of their requirement.

DOWTY GROUP, LIMITED—Share and cash offer worth over £2,100,000 has been made for the entire issued capital of Boulton Paul Aircraft, Limited, Wolverhampton. Terms are 8s. in cash and one 10s. Dowty ordinary share for every two 5s. ordinary units of Boulton Paul, ex-dividend. The Boulton Paul board is recommending acceptance.

UNITED STEEL COMPANIES, LIMITED—Of the 10,000,000 new ordinary shares offered to ordinary shareholders of the company at 20s. per share, acceptances have been received in respect of over 99 per cent. The balance, 92,802 shares, has been sold for the benefit of the ordinary shareholders to whom such new shares were provisionally allotted.

SMITH & WELLSTOOD, LIMITED, ironfounders and heating appliance manufacturers, etc., of Bonnybridge (Stirlingshire)—Turnover and profits of the group for the six months to December 31, 1960, show an increase against the corresponding period of 1959. Interim dividend is raised to 3¼ (2½) per cent., an increase which in view of the uncertainty of the economic climate and the effect of increased costs in reducing profit margins, must not be taken as implying an increase in the total dividend.

GENERAL ELECTRIC COMPANY, LIMITED—Interim dividend is maintained at 3 per cent. for the year ending March 31, 1961. Provisional results for the first eight months' trading and the estimated figures for the remainder of the current financial year indicate that the profit for the year will be somewhat lower than last year, mainly due to reduced trading in the radio and domestic equipment groups. Progressive changes are to be made in administrative structure, and further steps to strengthen the management are planned.

BRIGHTSIDE ENGINEERING HOLDINGS, LIMITED—Expansion is limited by the inadequate supply of technicians and operatives, states Mr. Tom C. Firth, the chairman, but everything is being done to improve the position by training young men. The current year started with a good order-book and "another satisfactory year of trading" is expected. The group can only continue to prosper, Mr. Firth says, by improving efficiency and increasing output. Manufacturing and selling costs are higher and due to competition, margins are lower.

JOHN FOWLER & COMPANY (LEEDS), LIMITED—The locomotive division has shown a little improvement, but competition is becoming so severe that, despite the widening of the company's range and the technical success with new models, this side of the business is still very difficult, states the chairman, Mr. Arnold Carr, who adds that the directors will be in a better position to assess the future of this business at the end of the present trading year. The steel foundry at Sprotborough had a very good year, contributing well to the company's earnings, as a result of the high standards of technique and team spirit in the plant.

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News in Brief

PHILIPS ELECTRICAL, LIMITED, are this month moving their Scottish organization into the company's new regional headquarters, Highland House, Glasgow.

CAPITAL of Sandvik Steel Works, Sweden, is to be increased from 83,000,000 kr. to 110,670,000 kr. by the issue of one new share for very three held at a price of 150 kr.

MOTHERWELL BRIDGE & ENGINEERING COMPANY, LIMITED, are to build a recreation centre in Logans Road at a cost of £20,000 and a time-office at a cost of £3,500.

MCCALLUM TROPHY, awarded annually by Doncaster Borough Savings Committee to firms with over 200 employees, has been won by the Ford Motor Company, Limited.

VILLIERS ENGINEERING COMPANY, LIMITED, Wolverhampton, has purchased the firm of John Roper & Son, Limited, gear-cutting specialists, Upper Villiers Street, Wolverhampton.

UNITED DOMINIONS TRUST, LIMITED, opened a new branch office in Bolton on January 30 at Barclays Bank Chambers, 29, Market Street, Bolton, Lancashire (telephone: Bolton 26276/7/8).

ANDERSON BOYES & COMPANY, LIMITED, mining-machinery manufacturers, are to erect a machine and assembly shop in Roberthall Road, Motherwell, at an estimated cost of £120,000.

BRYANT & STENNER, LIMITED, bronze and aluminium founders, have removed to new premises at F.114a, Purland Road, Woolwich Industrial Estate, London, S.E.18 ('phone woolwich 8171).

ERECTION HAS BEGUN at the iron and steel works at Ostrava, in the Moravian region of Czechoslovakia, of an oxygen converter—the first LD-process steel equipment to be used in the country.

AN ORDER from Khartoum for 18 diesel locomotives, worth £200,000, has been secured by the Hunslet Engine Company, Limited, of Leeds. It will ensure continuity of work for the firm well into 1962.

BECAUSE of an improvement in the order position the 150 workers who were on short time at the Peterhead gear plant of Euclid (Great Britain), Limited, have reverted to a normal working week.

AN ORDER from the East German Republic for well over £100,000 worth of the company's British-built industrial tractor-digger units has been obtained by Massey-Ferguson (Export), Limited, of Coventry.

TWO NEW Siemens-Martin furnaces have been opened by the Bethlehem Steel Corporation at its Lackwanna, N.Y., plant. Twelve furnaces at the plant now operate to the Siemens-Martin system, out of a total of 35 furnaces.

THOS. FIRTH & JOHN BROWN, LIMITED, Sheffield, are to spend about £400,000 on a new vacuum-melting shop. A consumable-electrode arc-furnace, ordered from Germany, will produce ingots up to seven tons in weight, and 24- to 26-in. dia.

VISIT TO MOSCOW is to be made by 48 directors of member companies of the Gauge and Tool Makers' Association during the British Trade Fair to be held there from May 19 to June 4. They will leave London on May 27 and return on May 31.

STEEL COMPANIES in the US plan to reduce 1961 expenditure for new plant and equipment to $1,200,000,000—about 19 per cent. less than spending in 1960. Capital expenditure of nearly $1,300,000,000 last year was surpassed only in 1957.

APPRENTICES of George Kent, Limited, received awards from the chairman, Comdr. P. W. Kent, at the company's annual apprentice prize-giving last week. Guest speaker for the occasion was Mr. W. F. Stephenson, principal of Luton College of Technology.

H. & E. LINTOTT, LIMITED, Horsham (Sussex), electro-mechanical engineers specializing in a wide variety of high-quality, light and heavy precision manufacture for the nuclear and general engineering industries, has changed its name to Lintott Engineering, Limited.

A NEW FACTORY and offices, costing £24,000, have been opened at Stonebridge Highway, Coventry, by Stuart & Davis, Limited, manufacturers of machine-tools and pneumatic control gear. The firm which started in 1945, now has more than 100 employees.

THE 325TH CUTLERS' FEAST will take place in the Cutlers' Hall, Sheffield, on March 14. The principal guests of the Master Cutler, Mr. C. H. T. Williams, will be the Right Hon. Edward Heath, the Lord Privy Seal, and Lord McCorquodale, president of the British Employers' Confederation.

NEW COMPANY. Expert Industrial Controls, Limited, has been formed to bring together under one name two established members of the Expert Tool & Case Hardening Company, Limited, group—Sharp Control Gear, Limited, and Electram Coil Winding & Transformer Company, Limited.

BRITISH MOTOR CORPORATION (AUSTRALIA), PTY., LIMITED, is dismissing 400 men from its Zetland (New South Wales) plant because of a cut in production that the company states has been made necessary by the Government's recent credit restrictions. About 3,700 men and women are employed at the plant.

AN ISRAEL COACH-TOURING COMPANY has ordered 15 Leyland "Tiger Cub" passenger chassis fitted with Danish-built coachwork from Dansk Automobil Byggeri A/S, of Silkeborg, Denmark. The concern is Sightseeing, Limited, which has its head office in Tel-Aviv and branches in Haifa and Jerusalem.

A DELEGATION from the Federation of British Industries, led by Sir William McFadzean, president, is going to Spain this month to discuss Anglo-Spanish trade. The visit is being made at the invitation of the Consejo Economico Sindical Nacional, which sent a party of industrialists to the United Kingdom last year.

RICHARD BAXENDALE & SONS, LIMITED, of Chorley, manufacturers of "Baxi" fireplaces, are to transfer their works and headquarters from Chorley to Bamber Bridge, near Preston. They have acquired the former engineering works of Thomas Blackburn & Sons, Limited, and expect that the transfer will be completed by early March.

TURNER & NEWALL, LIMITED, announce arrangements have been made to acquire the whole of the share capital of Stillite Products, Limited, manufacturers of mineral wool products at Stillington, County Durham, and South Bank, Middlesbrough. The acquisition will enable Turner & Newall to make a useful addition to its range of insulating materials.

THE 32,000-TON TANKER "London Confidence," built for London & Overseas Freighters, Limited, has been successfully launched at the yard of N.V. Koninklijke Maatschappij 'De Schelde,' at Flushing. The tanker will be propelled by a 16,500-h.p. engine, to be built by the yard, and is the second vessel constructed by 'De Schelde' for the same company.

NEWTON CHAMBERS & COMPANY, LIMITED, Chapeltown, Sheffield, have secured an order from the Pakistan Government worth nearly £200,000 for eight

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NCK-Rapier excavators. The order was obtained in the face of keen international competition, including Germany and the United States. The machines will operate as drag lines and will be used on the vast schemes for the fertilization of the Punjab.

A VISIT TO IRAQ is being made by a party of British businessmen for the purpose of renewing and extending trading contacts, and of assisting in the development of the Iraqi economy. The party, organized jointly by the Advisory Council on Middle East Trade and the Federation of British Industries, and led by the Hon. H. G. Nelson, managing director of English Electric Company, Limited, is due to return to the UK on February 10.

MEMBERS OF the Northampton branch of the National Union of Blast Furnacemen employed by Wellingborough Iron Company, Limited were told this week that 60 will be made redundant by the end of the month following the closing of one of the plant's two operative furnaces. Apart from employees of pensionable age, who will be retired, those made redundant will be offered jobs at Corby with Stewarts and Lloyds, Limited, the parent company.

AN ANTI-TETANUS IMMUNIZATION CAMPAIGN was started last month by Steel, Peech & Tozer branch of the United Steel Companies, Limited, Rotherham. Volunteers for inoculation will receive two injections at three-week intervals, and then an annual injection to keep up the immunity. It is stated that the new injections will cause no unpleasant after effects such as are sometimes experienced under present procedure. The men exposed to tetanus are those who handle crude scrap in the firm's stockyard.

JOINT one-day conference on "New Technical Libraries in Industrial Organizations" is to be held by the Association of Special Libraries and Information Bureaux and the British Institute of Management at the Connaught Rooms, London, W.C.2, on March 14. The speakers will include Mr. R. Sewell, information officer, research and development department, United Steel Companies, Limited, and Mr. D. V. Arnold, head of the intelligence department, heavy organic chemicals division, Imperial Chemical Industries, Limited.

MORE THAN 40 SHEFFIELD FIRMS were represented at a film show of last year's Hanover Industries Fair given at the Royal Victoria Hotel, Sheffield, to introduce Sheffield business men to the facilities offered by the Fair. Mr. H. J. Roehreke, deputy manager of the foreign relations department of the Deutsche Messe-und-Austellungs-A.G., organizers of the Fair, introduced the film. The Fair will be held this year from April 30 to May 9, and about 5,000 firms, including 900 from abroad, and 98 from Britain, will be represented.

A NEW THREE-TON ELECTRIC ARC-FURNACE was commissioned at the Fitzwilliam Works of Darwins, Limited, Sheffield, on January 25. The 1800 kva. furnace has been supplied by Birlec-Efco (Melting), Limited, and with ancillary plant has cost about £50,000. Its eventual output of 100 tons per week will double melting capacity of the foundry in which it is located. The production of high-grade steels will be partly used in the foundry, enabling bigger castings to be made, but more will be converted from ingots into steels for direct use by toolmakers.

GEORGE MANN & COMPANY, LIMITED, of Leeds, a member of the Vickers group, is to build British-made Duplex presses. World manufacturing rights, patents and technical production details of the Duplex reel-fed flatbed newspaper and pocket-book press have been purchased from Buhler Brothers, of Uzwill, Switzerland, by Gordon & Gotch, Limited, of London, and George Mann & Company, Limited, have been appointed British manufacturers. There will be a price reduction of about 12½ per cent. and the export market will be developed. The interest in Duplex has been sold by Buhler Brothers because of growing demand on their production capacity for machinery for flour-milling and other agricultural and food purposes which are their main interest. The production of lithographic printing presses has been the sole activity of George Mann up to the present.

MR. REGINALD MAUDLING, President of the Board of Trade, was chief speaker at an export convention held in Wolverhampton, organized by the Wolverhampton Chamber of Commerce and the *Express and Star*, Wolverhampton. The stress at the convention was on opportunities offered by the European Free Trade Association. Mr. Maudling said Britain's objective in the round of negotiations in GATT (General Agreement on Tariffs and Trade) soon to be started, was to come nearer reducing tariff barriers of the industrial nations. Whilst this would mean more competition, in exchange there would be widening opportunities abroad. The Outer Seven countries provided a trading community of more than 90,000,000 people, with a high standard of living and a high propensity to import. They would have within the area growing advantages as far as tariffs were concerned, and a great deal of goodwill and a positive desire to buy British goods whenever possible. "Since the formation of the Association, the partners had expanded their trade with Britain faster than Britain had expanded her trade with them," said Mr. Maudling, and added "we must look for more exports from small- and medium-size businesses which remain the backbone of British industry and economy."

Obituary

Mr. A. E. SIMPSON, sales director of Raleigh Industries, Limited, Nottingham, since 1938, has died. He had been with the company for 50 years.

The death has occurred, at the age of 77, of Mr. ERNEST POTTS, foundry manager with Westinghouse, Brake & Signal Company, Limited, Chippenham (Wilts), from 1921 until he retired 10 years ago.

Mr. T. A. CLAPHAM, managing director of Clapham Bros., Limited, gas-plant manufacturers, Keighley, and chairman of the Ferro Concrete Construction Company, Limited, Derby, has died at the age of 80. He was a former president of the Keighley Association of Engineers.

The death occurred on January 22 at the age of 78 of Mr. ALBERT CROWTHER, works manager with Willsons Lathes, Limited, Halifax, from 1938 until his retirement in 1953. After serving his apprenticeship with a Halifax firm, he founded the firm of White Machine Tool Company which he ran until joining Willsons.

Colonel WILLIAM HENTON CARVER, a former director of the London & North Eastern Railway Company, Limited, until nationalization, died on January 28 at the age of 92. He was a founder member of Hull Pacific, Limited, High Street, Hull, and had been president of Hull Incorporated Chamber of Commerce and Shipping.

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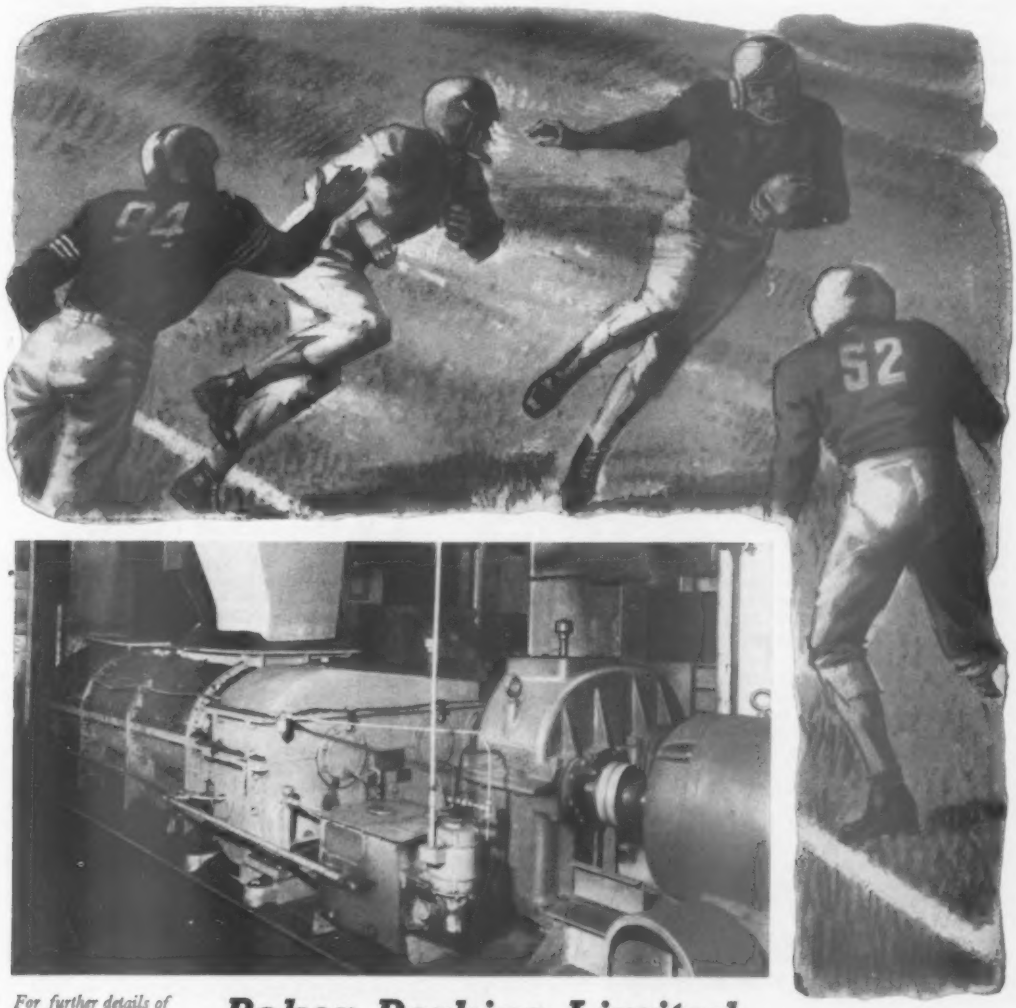

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Raw Material Markets

Iron and Steel

Reduced demand for castings from the motor-car industry continues to restrict outputs from the engineering and speciality foundries which produce high quality castings chiefly for this trade. In the Midlands, where many of these foundries are situated, the recession is being severely felt. Some foundries are working short time and even then finding it difficult to keep up the present rate of production on declining delivery schedules. Little deterioration has so far taken place in the demand for castings for commercial vehicles and tractors, although some doubt is expressed as to whether the present rate of usage will be maintained. The foundries supplying these castings continue to obtain good outputs, together with those producing for many other users, from which substantial demands are forthcoming.

Those foundries which use low phosphorus irons, hematite, and some refined iron are well provided with supplies, and most producers would have no difficulty in stepping up deliveries. Although the overall demand for the low phosphorus irons has shown a decline, this grade is still in greatest demand and substantial tonnages are being called for. Most of the light foundries need more work, since production is well below capacity levels. Builders' castings are in good demand and the foundries supplying them are fairly well occupied. From the domestic utensil trade the call for castings is moderate, and the dependent foundries are only moderately employed. The jobbing and textile foundries also could undertake more work. The high phosphorus irons used by them and some of the engineering foundries is in good supply, and producers could increase appreciably on present deliveries. Consumers abroad continue to take up consignments, which assists the furnaces in keeping their stocks down.

Producers of all grades of pig-iron have adequate supplies of raw materials available, including ore and coke, for both consumption and stock requirements. The major portion of outputs is being supplied to the steelworks in the form of basic pig-iron on which they rely mainly for their ingot outputs, due to the scarcity and spasmodic supply of scrap. In the Midlands in particular, both cast-iron and steel scrap are scarce, while special grades are difficult to obtain, with a consequent hardening of prices. Foundry coke deliveries are satisfactory and ganister, limestone, and firebricks are readily available.

The re-rollers continue to obtain good outputs of their products with the orders now in hand, although, except for reinforcing rods, demand is not now so heavy. Regular orders are being received for small bars and light sections, although generally the quantities are smaller than before. Demands for hot rolled strip and bright drawn bars have been adversely affected by the reduced demands from the motor-car trade. The re-rollers are well provided with mild steel semis. They have fairly good supplies in stock and home steelworks can meet current demands without difficulty. The re-rollers are not absorbing fully available supplies and the tonnages now on offer are in excess of demands. There continues a good demand from the re-rollers for all arisings at the steelworks of suitable re-rolling defectives and crops.

Non-ferrous Metals

Copper is a nervous market in London, but the undertone is good and there is strong resistance to the price going much below £220 a ton. Nevertheless, prospects are still tied up with President Kennedy's plan, results from which will take some time. Meanwhile, copper's poor statistical position exerts itself to keep prices low. The present low price levels are felt by some to have more than discounted the current situation, while others feel that demand will be unable to keep up with production, despite the cut-backs in production, and that the quotation will remain at around or below current levels.

The position is probably a little clearer for those in the US where 5,000,000 unemployed cannot be ignored, and it is no wonder, therefore, that American voices are raised for the formation of an international control scheme for copper run on lines similar to those of the Tin Council. In any event, the US market is weak although official prices are unchanged at 29 cents a pound (equivalent to £232 a ton) for both custom smelters and producers.

Tin is a quietly steady market in London, but indifferent in New York and in Singapore. Yet faith in the future of the metal remains undimmed and the three months metal price is around £790 a ton. Indeed, the belief is that the price will go up to £830 a ton, the price at which the buffer stock manager can sell metal in the market. In the meantime, buying, though somewhat sporadic, is coming in from the Continent and the statistical position is healthy. In the US the New York spot price is fluctuating narrowly around 101¼ cents a pound.

Lead in London is a fairly satisfactory market at the present low price levels. The undertone is reasonably good, although this should not be taken as a sign that the quotation will rise far above its present price of around £64-£65 a ton. In the US the market is without feature and price unchanged at 11 cents a pound.

Zinc is an intermittently satisfactory market in London with the price trying to get back to over £80 a ton. But consumer interest is not great and the outlook is unchanged. In the US the market is flat and the price is unaltered for East St. Louis spot at 11½ cents a pound.

F. H. Lloyd's Staff Changes

Recent promotions and appointments among the F. H. Lloyd group of companies include the following: Mr. K. I. Powell has been appointed chief inspector, following the retirement of Mr. R. B. Naylor. Mr. C. B. Carter, A.M.I.MECH.E., A.M.I.PLANT.E., M.I.B.F., has rejoined the company to take charge of the Chittaranjan steelfoundry project. Mr. Howard Wright, until recently foreman inspector, has been promoted to inspection superintendent. Mr. A. B. Hunt has been appointed one of the project technicians at Chittaranjan. He leaves the job of furnace supervisor in Jamesbridge. Mr. G. Evans, who joined the company 24 years ago, has been promoted to test-house superintendent. Mr. Denis Parker, who left Jamesbridge furnace department to take up duties as furnace superintendent at Lloyds (Burton), Limited, has been appointed foundry manager. Mr. M. M. Carey, who joined the company five years ago as a supervisor trainee, has been promoted to assistant to the test-house superintendent.

BIRMINGHAM RAILWAY CARRIAGE & WAGON COMPANY, LIMITED—Sir Bernard Docker has resigned as chairman and managing director in order to be able to devote more time to his other interests. Col. F. A. Stanley, deputy chairman, has also resigned. Mr. Frank D. O'Brien Newman has been appointed acting chairman.

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Current Prices of Iron, Steel, and Non-ferrous Metals

(*Basis prices, delivered unless otherwise stated*)

February 8, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over:, Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P 10-ton lots or over, £23 5s. 0d., delivered Birmingham £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-Iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(*per ton unless otherwise stated, delivered*)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si £43 10s. 0d. to £46 0s. 0d., scale 15s. 0d. per unit, lumpy. 75 per cent. Si, £60 0s. 0d. to £63 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 11s. 0d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 14s. 0d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £61 10s. 0d*

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons & over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C, £40 11s. 0d.; silico-manganese, £43 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

*Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £220 10s. 0d. to £220 15s. 0d.; three months, £222 10s. 0d. to £222 15s. 0d.; settlement, £220 15s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 1½d. per lb.; rods, 232s. 6d. per cwt. basis; 20 s.w.g., 267s. 6d. per cwt.

Tin.—Cash, £787 10s. 0d. to £788 0s. 0d.; three months, £790 10s. 0d. to £791 0s. 0d.; settlement, £788 0s. 0d.

Lead (Refined Pig).—First half February, £64 15s. 0d. to £65 0s. 0d.; first half May, £65 17s. 6d. to £66 0s. 0d.; settlement, £65 0s. 0d.

Zinc.—First half February, £81 10s. 0d. to £81 15s. 0d.; first half May, £80 10s. 0d. to £80 15s. 0d.; settlement £81 15s. 0d.

Zinc Sheets, etc.—Sheets, 15g., and thicker, all English destinations, £117 15s. 0d.; rolled zinc (boiler plates), all English destinations, £116 0s. 0d.; zinc oxide (Red Seal) d/d buyers' premises, £95 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 9d. per lb.; sheets to 10 w.g., 191s. 0d. per cwt.; wire, 2s. 7¾d.; rolled metal, 191s. 0d. per cwt.

Brass (Brazing).—BS1400, B3, £173; B6, £218.

Brass (High Tensile).—BS1400, HTB1, £193; HTB2 £210; HTB3, £229.

Gunmetal.—BS1400, LG2, £215; LG3, £224; G1, ½% £288; G1, 1%, £278.

Phosphor Bronze.—BS1400, PB1 (AID released), £305; BS1400, 90/10/1, £293.

Leaded Phosphor Bronze.—BS1400, LPB1, £236.

Phosphor Bronze Strip, etc.—Strip, 277s. 9d. per cwt.; wire, 3s. 11¾d. per lb.; rods, 3s. 3¾d.; tubes, 3s. 3d.; chill cast bars, solids 3s. 2½d.; cored 3s. 3½d. (CHARLES CLIFFORD LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 9½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 2¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 1¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £69 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £242; AB2, £250.

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FOUNDRY TECHNICIAN (23), City and Guilds Foundry and Pattern-making Certificates. Served metallurgical apprenticeship, seeks interesting position in the foundry or allied industries in UK or abroad. Box FT581, FOUNDRY TRADE JOURNAL.

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SITUATIONS VACANT—*contd.*

TECHNICAL SALES REPRESENTATIVE required for Iron Foundry situated in South Durham. Applicants must have knowledge of Iron Founding and sales experience, hold current driving licence, age preferably under 35 years. Only those with the necessary qualifications need apply, with full details of experience, etc., and salary to Box TS585, FOUNDRY TRADE JOURNAL.

FOUNDRY TECHNOLOGIST. Practical qualified Foundryman required by medium size Birmingham Aluminium and Copper Base Foundry. Good salary for right man. Write giving full details to Box FT598, FOUNDRY TRADE JOURNAL.

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SITUATIONS VACANT—*contd.*

FOUNDRY MANAGER. Small Foundry, Gun Metal/Brass, situated Birmingham area, requires Foundry Manager. Good organising ability necessary. Technical background on foundry theory an advantage. This is a progressive position with starting salary to £1,100 per annum. Box FM586, FOUNDRY TRADE JOURNAL.

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BOX AP. 584 Foundry Trade Journal

SITUATIONS VACANT—contd.

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Box TF597, Foundry Trade Journal.

SITUATIONS VACANT—contd.

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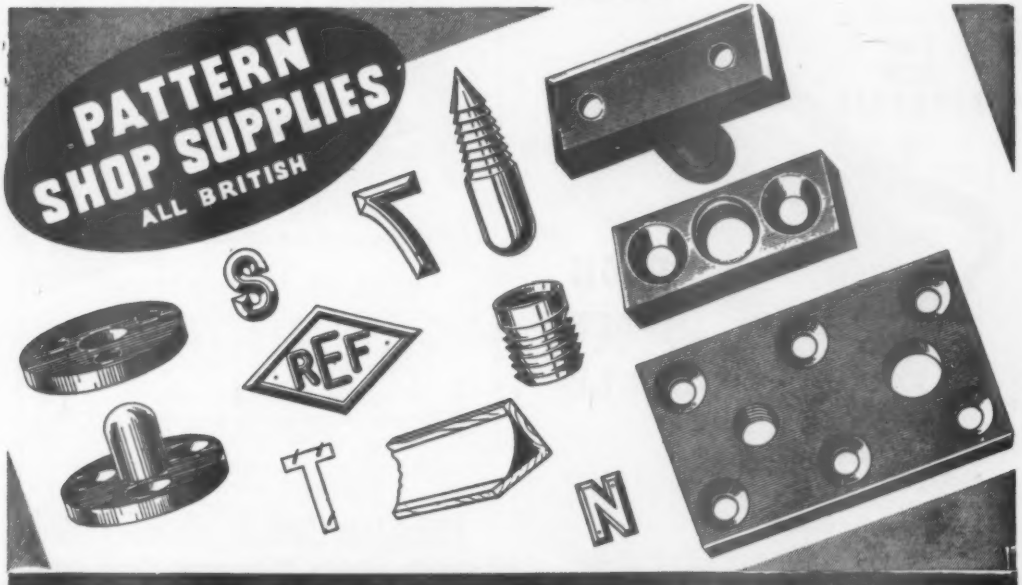

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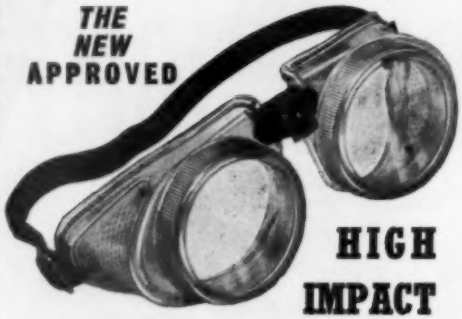

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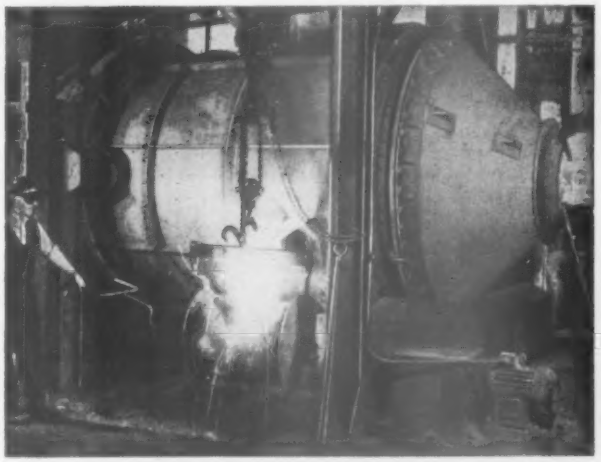

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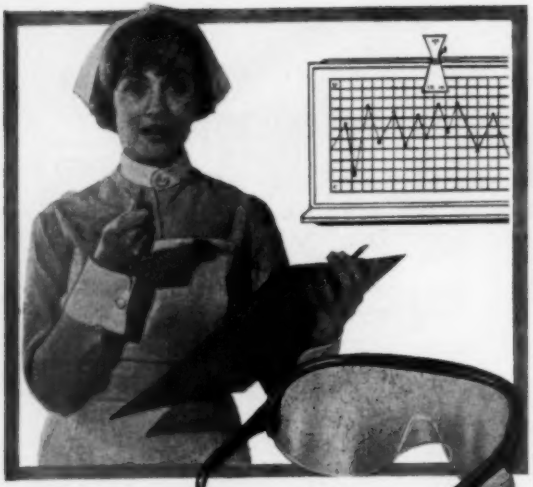

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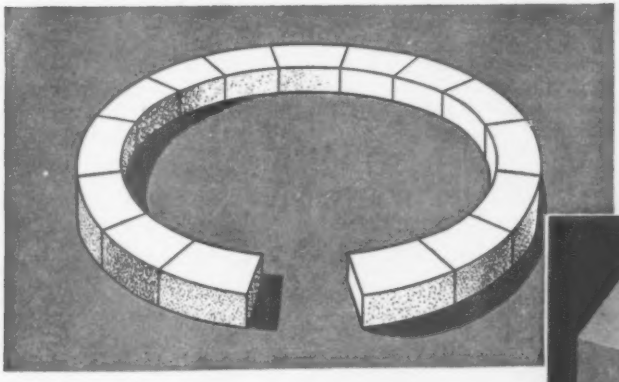

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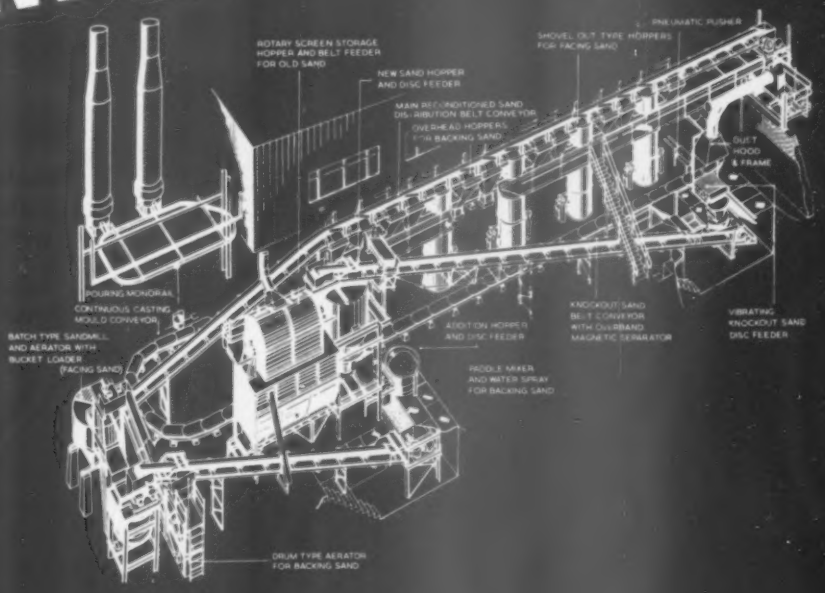
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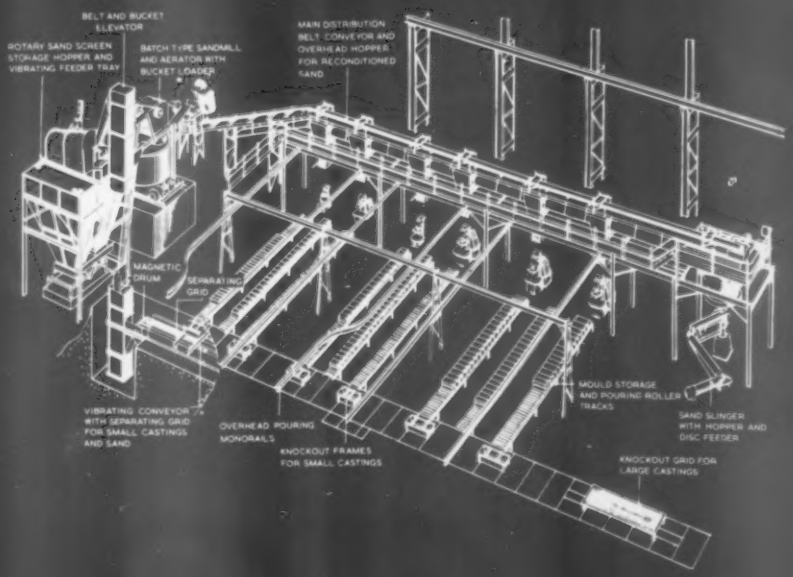
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